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Communications relating to membership and matters pertaining to the American Veterinary Medical Association itself should be addressed to Secretary L. A. Merrillat, 1827 S. Wabash Ave., Chicago, Ill. Matters pertaining to the Journal should be sent to Ithaca, N. Y.

THE SOUTHEASTERN STATES VETERINARY MEDICAL ASSOCIATION

This is a new association, toward the organization of which steps were taken by some of the southern veterinarians while in attendance at the Detroit meeting of the American Veterinary Medical Association last August. It is expected that the organization will be completed at the first meeting to be held at Atlanta, Ga., December 27 and 28. An interesting and important program is being prepared. The temporary officers elected at Detroit are Drs. Tait Butler, Tennessee, chairman; G. A. Roberts, general secretary and resident secretary for North Carolina; C. A. Cary, Alabama; W. H. Burson, Georgia; F. P. Caughman, South Carolina; F. W. Porter, Florida. With such men behind it, the future would seem to be assured.

Of the various sections of our country, none has received less recognition from the A.V.M.A., so far as meetings are concerned, than the South. Twenty years ago (1897) the association ventured as far as Nashville, Tenn., and in 1914 arranged plans for a meeting at New Orleans, but cancelled it because of the prevalence of the foot-and-mouth disease. This section of our country

has as great a claim upon us as any other. In its fifty-three years of existence the A.V.M.A. cannot be accused of showing any undue partiality for the South. If there is any section entitled to a grievance, it is the South, but we venture to express the belief that the new association is being organized entirely independent of any such spirit.

Organization, whether it be local, state, inter-state or national, is a good thing for the profession. It develops, fosters and strengthens community of interest and coincidentally the interest of the community. State or interstate associations do not retard the growth of a national organization; they promote it. There should be a spirit of cooperation for the good of the profession and the public it serves. We trust that the organization of the new association will stimulate the A.V.M.A. to recognize more generously the just claims of the South. We trust the Southeastern States Veterinary Medical Association will succeed—that it may live long and prosper.

P. A. F.

DIET AND ABORTION

It is probably a natural and common belief that all of the requirements have been met when a balanced ration for the animal has been prepared. So long as the proper proportion of digestible protein and energy producing material is present, little thought is given as to its source or that it should have anything but a beneficial effect upon the processes of growth and reproduction. It might be expected that just as vigorous offspring should result, no matter where the material of the diet came from, so long as it was arranged in a balanced form.

That this view needs some modification has been pointed out by Professor E. B. Hart, in a paper* presented at the last meeting of the Wisconsin Veterinary Medical Association. Experiments were tried on a group of grade Shorthorns while they were at an approximate weight of 300 pounds. Balanced rations were prepared from the corn, wheat and oat plants and a mixture of the three. It was observed that the animals grew fairly well on all the rations but it could be seen that those receiving wheat were not as vigorous or well developed as the other lots.

*The Influence of Certain Natural Feeding Materials on Growth and Reproduction.

Another experiment upon some young grade Holsteins with corn and wheat rations showed that those receiving the corn ration grew well, matured, showed early estrum and were physically strong in every respect; while those receiving the wheat ration grew only at a fair rate and when they attained the weight of 1000 pounds, they ceased to grow. They began, in fact, to lose weight and showed no vigor. There were evidences of physical weakness and even blindness ultimately resulted. They showed no estrum and to have continued them for breeding purposes was utterly futile. So pronounced was the emaciation it was deemed advisable to kill them.

Because of the prevalence of contagious abortion in this country, it might naturally be asked if this affection might not enter into and complicate the results of the experiments. Such a contingency was considered and during the course of the experiments the animals were placed under the observation of, and tests made by, a competent veterinarian, who declared the animals to be free from the disease.

With an oat ration or a mixed ration, the offspring were good but in no case did they appear to be quite so vigorous as those fed upon a corn ration. While it may appear, in general that a mixed ration is safest it may, nevertheless, be shown that a restricted ration may be physiologically perfect and a mixed ration may contain something deleterious to its physiological value. When a corn fed animal was changed to a wheat ration, it became exceedingly stiff and if the wheat ration was continued too long prostration would result.

Attempts to locate the trouble in the wheat ration showed, for one thing, a deficiency of a proper salt mixture. If an animal was fed upon corn grain and wheat straw the offspring were weak and sometimes born dead. When to the same ration a suitable salt mixture was added, perfect offspring resulted. If the corn grain of the ration was displaced by wheat grain and the salt mixture added, disaster again resulted. Evidently something more than the salts was responsible. The second factor appears to be an inherent toxicity in the wheat grain. This toxicity was not apparently affected by heat; for when baked wheat was fed there was no improvement. The addition of butter fat to the wheat ration, to supply the growth promoting factor was not uniformly successful. There was failure as well as success.

When wheat grain was mixed with a legume hay, such as alfalfa, so that the alfalfa formed but 20% of the ration, there was perfect success and normal offspring were produced.

Later work has shown that the toxic material is very largely present in the embryo of the seed. When wheat embryo was imposed on corn stover so that the ration contained four to five times the amount of embryo as would ordinarily be present when whole wheat was fed, an early abortion resulted—the calves being dropped at six or seven months.

In the process of milling the embryos pass into the wheat bran in small amount, but in wheat middlings they appear in much greater quantity.

Histological study of the spinal cord of animals fed on the wheat ration revealed an edematous condition of the motor cells and an appearance of compression and partial degeneration of the cells. The effect upon the nervous system would suggest a cause for the blindness which occurred in some cases.

The experiments are of great interest in showing the limitations of the theory of a balanced ration; they indicate the importance of factors other than the presence of protein and latent energy in the successful diet; the necessity for the proper balance of inorganic salts in directing the metabolic processes of the body, is well illustrated; the presence or absence of vitamins (growth promoting substances) concerning which our knowledge is yet too limited, and their relation to deficiency diseases; all emphasize how really complex the problem of nutrition is and how fundamental it is in attaining the best results.

Aside from its great physiological interest, the work of Professor Hart should also have a very direct interest in relation to abortion disease—the disease which, at present, is such a menace to the cattle industry of this country. It is possible, in some instances, that abortion may be an affair of nutrition rather than of the *Bacillus abortus*. In the wheat growing districts, it may be expected that wheat in some form may serve as a portion of the ration. If to this the abortion bacillus be added, the course of the disease should be facilitated. On this ground contagious abortion might be expected to be more prevalent in wheat growing districts. Statistics would be interesting. Since the experiments indicate that strong, vigorous offspring are produced when a corn ration is fed, it might be expected that abortions might be less frequent in corn

raising districts. Even when the problem is complicated by the presence of the abortion bacillus, it might be expected that a corn ration might assist in conferring increased resistance to the ravages of the disease. Again statistics would be interesting.

All of this should be of interest to the practical veterinarian. Physiological as well as pathological factors in conjunction with sanitation should be considered. In the light of the experiments, the least that can be done is to inquire into the diet.

P. A. F.

OKLAHOMA STATE VETERINARY MEDICAL ASSOCIATION

The profession throughout the United States will be glad to know that the two associations of graduate veterinarians that have existed in Oklahoma have passed into "innocuous desuetude". Under the able leadership of Dr. R. F. Eagle a new association has been formed that is going to put Oklahoma on the veterinary map. The first meeting of this new association was held in Oklahoma City, October 23rd, 24th and 25th with about one hundred of the leading veterinarians of the state attending. Mr. Overholser, mayor of Oklahoma City, John Field, editor of the *Oklahoma Farmer*, and T. P. Martin, president of the Oklahoma Stock Yards National Bank gave their hearty support and showed their interest, not only by addresses but by attending the sessions. Drs. Lewis Crabb of Ft. Worth, Texas, D. F. Luckey, state veterinarian of Missouri, R. C. Moore of St. Joseph, Mo., A. T. Kinsley and H. Jensen of Kansas City, J. A. Kiernan of the B. A. I., and N. S. Mayo of Chicago were present by invitation to take part in the program and assist in launching the new association. The first and second days were devoted to the literary part of the program while the third day was occupied by a clinic and visit to the stock yards, where the Bureau of Animal Industry had an exhibit of pathological specimens.

The first meeting of the new association was a success in every way. Every member is going to boost as only Oklahomians can and they promise to send a delegation of "Sooners" to the next A.V.M.A. meeting that will make some other states much older "sit up and take notice".

Owing to the removal of Dr. Eagle to Chicago, he tendered his resignation as president and Dr. J. S. Grove was elected to suc-

ceed him. We shall take some liberty with Rip Van Winkle's classic toast and say "Here's to the success of the O.S.V.M.A. May she live long and prosper." N. S. M.

EUROPEAN CHRONICLES

Bois Jerome.

RELIEF FUND FOR BELGIAN VETERINARIANS.—The manuscript of my September contribution to the *Journal* had just been mailed when the following letter was received:

Dear Dr. Liautard:

To-day marks the close of the meeting of the N. Y. State Veterinary Medical Society. It has been an interesting and I hope, profitable meeting. There were about 100 in attendance and apparently they enjoyed themselves quite thoroughly. Your work in connection with the League for the Relief of the Belgian Veterinarians was spoken of. Dr. W. G. Hollingworth of Utica, N. Y. circulated a subscription list and about \$100.00 in cash were paid in. I am enclosing a draft on Paris for 584 francs. Much credit is due Dr. Hollingworth for taking hold of the matter so energetically and for the success obtained.

Trusting there may be more subscriptions and assuring you of my best personal regards, I am

Very truly yours, P. A. FISH.

The check was received and handed to the treasurer of the funds who, while and until it is officially acknowledged, wishes me to address to the N. Y. State Veterinary Medical Society, Doctor Fish and Dr. Hollingworth for their initiative in this subject the gratitude of all, for the handsome evidence of professional solidarity. Who will be next?

THE TOXICITY OF SOYA BEANS.—This is the subject of a communication from Sir Stewart Stockman relating to a report of the death of many cattle fed with meal from the beans after extraction of the oil contained in them. While there are several members of the order Leguminosae, to which Soya belongs, which have poisonous properties, there can be but little doubt about the non-poisonous character of Soya, which for many years has been used for human food and is widely employed in the feeding of stock all over

the globe. Soya is very rich in oil and it is after this has been extracted that the residue is sold in the form of meal or as cakes for feeding cattle.

Sixty-seven cows had been reported sick and fifty-four of them had died.

The symptoms can be summarized as follows: first, falling off of the milk, then nasal trickling of a bright red-colored blood; visible mucous membrane congested and sometimes bleeding in spots. Rumination suspended, coat staring: temperature 105°F. to 109°F. Dung normal at first, later coated with blood-stained mucus: urine normal, some abdominal pain. Nodules varying in size from that of an egg to that of a child's head felt under the skin and extending into the muscles: sometimes lameness by intermuscular hemorrhage.

If the animal retained a tendency to eat and ruminate a possible recovery might be looked for. Death generally was sudden or after the animal had become weaker and weaker.

Post-mortem showed the lesions of hemorrhage through the tissues and organs.

There was hemorrhage in the larynx, trachea and bronchial tubes, the lungs being pale. The pleura, visceral and parietal showed patches of hemorrhage. There was also hemorrhage in the pericardium and the heart substance. The alimentary tract and the lining of the abdominal walls also showed many. In the fourth stomach the mucous membrane was also covered with hemorrhagic spots. The small and the large intestines also. Towards the rectum, the blood vessels were engorged. Many of the abdominal lymphatic glands were also hemorrhagic. Yet the liver, spleen and kidneys showed no marked alterations.

Careful consideration of the lesions recalled some of the conditions of cattle plague, East Coast fever, bracken poisoning, hemorrhagic septicemia or anthrax, brought out the conclusions, after attentive inquiries, that the trouble was due to Soya beans, some of which, it was reported, had been prepared in a different way than usual.

Material, from different places of preparation, was obtained and a series of experiments was carried out on different species of animals.

The conclusions offered in the communication of Sir Stockman are:

1st.—The cases produced at the laboratory by feeding on extracted Soya cakes and meal are identical in symptoms and post-mortem lesions with the cases occurring in the fields among cattle which were fed on similar material.

2nd.—In both cases, the animals were receiving other food-stuffs, (some went out to grass). This discredits the possibility of the trouble being due to a deficiency in vital constituents, as in the scurvy type of disease.

3rd.—In most cases the trouble some times did not show itself until one or two weeks after the extracted soya or cake had been discontinued and the animal had been turned out to grass. This is a curious feature and points to the conclusion that the poison is one which requires some time to act, although a poisonous dose is present in the system. It might also mean that the actual poison is manufactured inside the animal by a slow process from extracted Soyas.

4th.—The extracted Soya in no case (practice or laboratory) produced a sudden effect: in all, a considerable amount was consumed and a considerable time elapsed before signs of illness appeared. The smallest amount consumed at the laboratory before the disease began was 172 lbs. (36 days): the shortest time in which the disease appeared was 29 days (201 lbs.)

5th.—No species, other than cattle, suffered from feeding on the meal or cake, either in practice or at the laboratory.

6th.—The very high temperature (106° to 109° F.) accompanying the illness seems to exclude the ordinary poisons, but does not exclude a poison of the ricin class. Specific bacterial infection was excluded by test inoculations, microscopical and bacteriological examinations made by the fact that a sterilizing temperature was used in the process of manufacturing. No castor seed could be traced in the meal.

7th.—From inquiry (very wide) whole Soya bean is not poisonous.

8th.—From inquiries among manufacturers, there is plenty of evidence that Soya extracted with naphtha does not cause poisoning, and it would appear that the trouble followed the use of Soya extracted with trichlorethylene.

9th.—Trichlorethylene itself, however, is not poisonous when given to cattle in comparatively large doses, 1 to 3 ozs., and for long periods. It may be (a) that the products from trichlore-

thylene obtained by heat are poisonous (this is doubtful.) (b) that the trichlorethylene in contact with the Soya and heat used to drive off the former, forms a poison: or (c) that some of the trichlorethylene was impure and contained other bodies.

10th.—It would appear from what occurred in practice that all bovines are, at least, not badly affected by the poison.

11th.—If it be that, in order to obtain a poisonous quantity of the active agent, some 200 lbs. or more of the material must be extracted, it would hardly seem to be a process which could be undertaken in an ordinary laboratory but would require a small manufacturing plant.

12th.—If it be that the active agent is elaborated from the extracted Soya in the digestive organs of bovines, the problem of isolation becomes still more difficult.

13th.—If this be assumed, the most promising method of search might be to produce cases experimentally and then try to extract a poison from their organs.

14.—Extracted Soya meal constitutes an excellent auxiliary food-stuff for cattle, but it is not advisable to use trichlorethylene as extractor.

EPIZOOTIC LYMPHANGITIS—TREATMENT.—In a previous communication I have already spoken on this subject. I may be allowed to do it again as I find that it has attracted the serious attention of our French confreres, the disease having taken extensive footing among some of the regiments of cavalry at the front where it has been undoubtedly imported by horses from North Africa.

From Professor Douville of the Lyon Veterinary School, who now occupies the rank of Major veterinarian I read a communication which he made to the Societe Centrale in which he relates his experience, which is substantiated by his observations on quite a number of lymphangitic horses. Several of them he has handsomely illustrated in plates showing the very peculiar aspect presented by the ulcerated abscesses of the leg, of the face and neck, of the sides of the thorax and of the pit of the arm. The very great resemblance that the ulcerated abscesses, with their extending lymphatic cords, have with those of cutaneous glanders, explains, to a great extent, the errors of diagnosis, which an incomplete investigation would have permitted.

In his communication, Professor Douville alludes to the old classical treatment: actual cauterization. For many cases he has found it impracticable, on account of its risks, as for instance, in the cases where the lesions are around synovial sacs or blood vessels such as the saphena, the jugular, the glosso-facial, etc. To remove the lesions, cords, abscesses, etc., the cautery is better than the bistouri. The cauterization must be deep and free, care being taken not to leave the slightest nodule or the smallest cord. Even with this care, the possibility of the infection is not entirely removed.

It is probable that such have recurred and for that reason internal treatment has been tried.

Professor Douville has used *Galyl*, a chemical compound, an organic aresno-phosphorus compound, a therapeutic study of which has been made by several therapeutists and found to be very active in some specific infections.

Galyl is not very toxic and is perfectly tolerated. It is a vasodilator and does not give rise to congestive manifestations. It has no neurotopic action, nor any coagulating effect on the albumins of the blood or on the red corpuscles, the liver or spleen. It is easily dissolved in water and forms a clear solution of a clear brownish yellow color. The dose is 0.90 centig, or one gram in a 1 per 100 or 150 solution. The injection is to be repeated every eight days but the solution must always be freshly made. These doses were used only at the beginning. Afterwards and with some experimenting, Douville found that to a horse of medium size, say weighing 500 kilogs, 3, 4 and 5 grams of galyl could be injected in the vein very slowly. A slight elevation of temperature may be observed during the day but it soon passes off. The size of the dose varies according to the condition of the lesions and can be reduced, if improvement is noticed in the fifteen days between the dates for the injections.

By this treatment, applied to 15 horses, exclusive of any other therapeutic interference, 11 were cured with doses varying between 5 and 6 grams, the treatment having lasted between one and three months.

The other four horses were destroyed on account of the extent and the severity of the lesions.

Galyl is not the only agent that Douville has experimented with, the medication with iodine has also been tested. To three horses, he has given potassium iodide. Two were cured. The

third had to be destroyed after a long and severe treatment. He had received 400 grams of the iodide and cauterization had also been freely applied.

Novarsenobenzol has also been resorted to. The results which may follow, are not yet complete. As in the treatment with iodide, Douville will communicate later.

In concluding for the present, the consideration of this subject, the treatment of epizootic lymphangitis, I may also pay some attention to the report made by Major Veterinarian Velu, who has used quite extensively the novarsenobenzol in intrajugular injections.

The report of Major Velu summarizes principally the history of three cases, but in neither of them has he obtained results superior to those obtained with colloidal iodine and iodide of mercury. In one of the cases the generalization of the disease was not prevented. In the second, recovery was not obtained. In the third, which was only a mild case, it would have been necessary to resort to surgical interference.

Velu seems to believe that little dependence can be placed on the use of novarsenobenzol, contrary to the opinion of Douville and of Bridre to whom I have already alluded.

AMEBIC DYSENTERY IN DOGS—EMETIN TREATMENT.—This is quite an interesting record of the success obtained by Indian Veterinarian F. Ware, M.R.C.V.S.

In a hill station of the Madras Presidency a pack of hounds was kept, in which for some years past dysentery had been a great source of trouble. Before deciding on the treatment which might give relief, it was essential to find out if the disease was really amebic dysentery, and if so, to try *Emetin* treatment. Seven hounds were affected, one being particularly bad.

Smears were taken from fresh feces and examined immediately, the slides being kept warm during examination, a necessary condition, as cold inhibits the movements of any amebae present and thereby renders them difficult of recognition.

In the feces of the one that was the sickest, one or more amebae were present and were pronounced extremely like *entamebae histolytica*, the cause of the disease in man.

Smears from another dog revealed the typical movements of the amebae, such as the protrusion of the pseudopodia, which were

distinctly seen, while the slide was warm. In several amebae, ingested red corpuscles were visible.

As it was not always easy to have an opportunity to examine thoroughly smears which contained few amebae and the difficulty in obtaining fresh feces, when wanted, as dogs have the habit of licking each other about the mouth and anus, it was supposed that very likely all the dogs that were sick, had the same cause as those from which smears had been taken. All the sick dogs were submitted to the same treatment of emetin.

One-half grain of emetin hydrochloride was, after a little thought, considered the proper dose. Tried on two hounds and having produced no ill effect, all the others were submitted to the one-half grain dose. Later this was raised to one grain and it seemed to have more effect, although it gave rise to vomiting in two of the dogs.

The emetin was given in subcutaneous injections, hypodermic tabloids being dissolved in distilled water.

Nine dogs altogether were treated in the same manner and received from 2 to 4 injections, according to their indications. Milk diet and a small dose of magnesia sulfate were given daily. The sick dogs were isolated.

While the report of Mr. Ware does not definitely settle the point that there is an ameba, capable of causing dysentery in the dog, it certainly is a strong evidence that at least such is the case among dogs in India.

The writer's conclusions are: that the chief point appears to be in the finding of the amebae before the injections of emetin are given, the marked effect of a few injections of emetin had on most of the cases, the inability to find living amebae in the feces of animals which showed signs of recovery.

If it be proved that such amebae pathogenic to the dog, exist there is the further interesting point as to whether it may be identical with that causing dysentery in man.

ADYNAMIC AND ANEMIC TYPHOSUS IN AMERICAN HORSES.— Since the beginning of the war a large number of horses have been brought from America to the continent. Many were landed in France and among them, typhosus has been probably the disease which has given the largest records of deaths. Major Bringard has published in the *Recueil* an article upon it, he having had the op-

portunity to witness a great number of cases in his function as Director of the Veterinary Service and as Chief of the Depots.

The cause of the disease was a state of debility due to the long journey from America and to the bad hygienic conditions under which the animals were conveyed.

The symptoms are given as follows: very high fever with a temperature of 40° C.; chills, extreme prostration and staggering gait; accelerated pulse, difficulty in feeding; mucous membranes dark yellow. Respiration, irregular and accelerated; heart palpitations from the slightest exercise; venous pulse. Auscultation reveals the presence of centers of lobular pneumonia with tinkling sound of pleurisy and pericarditis. By percussion, dullness is found over almost all the thorax. Diarrheic enteritis may also be observed and death is then more rapid. The urine is of a dark red color, due to the elimination of cholepyrrhine: it also shows a greater accumulation of phosphate crystals.

The prognosis is generally serious, and fatal with the animals which were intoxicated by the air breathed during the trip.

Among the lesions there are noticed: discoloration of the muscles, brick colored serosity under numerous false membranes in the thorax. Inflammation of the pleura and pericardium. Hypertrophy of the heart with softened structure. Lesions of acute enteritis with desquamation of the intestinal mucous and hypertrophic mesenteric lymph glands. Uncoagulated blood in the vessels, coloring the fingers strongly, reddening and coagulating in contact with the air. The red corpuscles are agglutinated and star-like. They are diminished in number in the animals which died with progressive anemia. The lungs often contained old cavities of pulmonary abscesses in which pus had escaped through the bronchia. There were also lesions of chronic induration indicating lobular pneumonia recently recovered.

The treatment prescribed and recommended by the writer consisted in slight purgation with calomel as a preventive, or on animals only suspected of becoming sick. When the disease is developed, mustard sinapisms, pilocarpine and salicylate of soda. The application of strong liniments was made above the swelling of the sinapism, four fingers wide and renewed once or more according to the case. Abscesses of fixation recommended by some are said to be dangerous, notwithstanding the good derivation that they procure, because they give rise to too debilitating suppuration and

dangerous sloughings of muscular tissues. Intravenous injections of oxygenated water are not without danger. Tallianine would be better. During convalescence arsenical medication is indicated. Physiological serum strengthened with a small dose of cacodylate of soda has brought recovery in desperate cases. Of course, good hygiene, good food, moderate exercise in the fresh air, are also essential conditions. Although the dangers of contagion are not serious, it is better to take precautions and have the animals isolated and resort to disinfection.

SUMMARY OF PUBLICATIONS RECEIVED.

Those marked "X" will be analyzed. Those marked "O" will appear in abstracts.

RECUEIL DE MEDICINE VETERINAIRE—(X) Serum Osmosis—Treatment of Wounds with Blood Serum Obtained by Osmosis, by Chatelain.

(X) Dr. P. Chausse, An Observation of Tuberculosis of the Vesiculæ Seminales, Efferent Canal and Urethra in a Steer.

(O) Velu—Note upon a Lesion of Intestinal Myasis in the Horse.

BULLETIN DE LA SOCIÉTÉ CENTRALE—(X) Piettre—Bovine Onchocerosis in South America.

Belin—A Case of Localized Tetanus—Oxydotherapy.

Dr. Roger—Some Observations of Nervous Colics.

(O) Dr. Detmer—Clinical and Therapeutic Notes.

(O) Descazeau—Treatment of Mange.

VETERINARY NEWS—Aug. 3d. Remarks on Castration by E. W. Hoare, F.R.C.V.S. Local Anesthesia by Prof. G. H. Wooldridge, F.R.C.V.S.

August 12. Joint Ill by Prof. Wooldridge.

VETERINARY RECORD—Aug. 5-16. Two Unusual Cases of Milk Fever.—Umbilical Hernia by A. Spier, F.R.C.V.S.

Aug. 19.—Epsom Salts by W. R. Davis, M.R.C.V.S.

(O) Cow Poisoned by Strychnine, by Country Vet.

Loss of Hoof by V. S.

(O) Aug. 26—Unsuspected Dental Trouble in a Cow by C. A. Squair, M.R.C.V.S.

REVUE GÉNÉRALE DE MÉDECINE VÉTÉRINAIRE—August 15.—Original Instruments Used During the Campaign 1914-15 by Major Veter. Freer.

(X) Treatment of Lumbar Myelitis (Dog's Illness) with Neurostenic Serum by Veloppe.

ANNALES DE L'INSTITUT PASTEUR.—Aug. 16. Studies on the Bacillus of Shiga by Nicolle, E. Debains, G. Loiseau.

(X) Upon the Etiology of Infectious Anemia of the Horse by Carre and Vallee.

Experiments on the Destruction of Schisto-cerca Verigina by the Cocobacillus—of Dr. Herelle by H. Velu and A. Drouin.

SUNDRIES RECEIVED—The Antigenic Value of Spirochaeta Hyos in Complement-Fixation Tests on Hog Cholera Sera by Walter E. King and R. H. Drake.

A. LIAUTARD.

THE PRESENT STATUS OF THE ABORTION QUESTION*

A. EICHHORN AND G. M. POTTER
Washington, D. C.

The great and ever increasing importance of abortion and the confusion which exists, not alone in the lay mind, but also among veterinarians, concerning this disease renders this topic a fruitful one for our consideration. Abortion, if it has not yet reached first place in point of economic loss, is fast approaching that bad preeminence. A few years ago an annual loss of \$20,000,000.00 was attributed to it, but when one has access to the correspondence from all parts of our country, as have the authors, and can see how extensive the disease has become, then that estimate seems altogether too small. Our knowledge concerning its distribution has rapidly increased, but its spread outruns our knowledge, and when viewing the whole field, one is appalled at the loss inflicted on the animal husbandry of this country.

It has been the habit of investigators to write only of their local situation, and of dairy cattle, kept under intensive conditions, but the disease has already extended to the range cattle, where it is proving even more destructive than among the former. Losses of 50% or even more of the entire calf crop are frequently reported, and in beef production the calf represents all. In general the losses are both direct and indirect. The direct loss is of course represented by the dead fetus, and in dairy cows the consequent loss of milk. The indirect losses, however, are probably just as great. The attendant conditions of sterility, and retained after-birth, and of white scours and calf pneumonia, matters which cannot be discussed in this paper, together with the cost of combating these affections, and the interference with cattle traffic must represent an enormous loss.

The existing confusion in regard to this disease results from the many conflicting theories, few of which in the present state of our knowledge can be verified. Different groups of organisms, causing abortion in the various species, add their share to this confusion, and then the fact that there is no generally accepted line of treatment makes confusion worse confounded. Each investigator

*Presented at the meeting of the A.V.M.A., Aug. 22, 1916, Detroit, Mich.

advances a treatment, and insists that his is best; there are numberless antiseptics, bacterins, the carbolic acid and methylene blue treatments, and worst of all the proprietary remedies for which unwarranted claims are made. It is not to be wondered at that the busy practitioner, who has no time to investigate these things for himself is unable to decide on the best course.

DIFFICULTIES OF INVESTIGATION. The difficulties connected with the study of abortion are many and varied. The chief difficulty lies in the fact that the disease is chronic, requiring, where abortions occur, an incubation period varying from a few months to almost the full term of pregnancy, according to the time and method of infection, and the virulence of the infecting organism. If acute, the affection would be more readily recognized and possibly more easily controlled. Abortion is very indefinite in its manifestations. The pregnant animal may and usually does appear to be in perfect health, and without any very noticeable premonitory symptoms the fetus may be expelled. On the other hand, abortion may be preceded by the usual signs of parturition, accompanied by a more or less characteristic discharge. The name "Contagious Abortion" is somewhat of a misnomer, as the affected animal does not necessarily abort. The disease may manifest itself as retained placenta or as sterility, or the calf may be born weak, and succumb later to white scours or pneumonia. Furthermore, it is not at all unusual for an animal to harbor the infection and be a disseminator of disease, yet show no symptoms whatever. The name "Abortion Disease" would seem, therefore, to be a more appropriate designation.

The *Bacillus abortus* of Bang, which is generally conceded to be the cause of the disease, itself adds to the difficulty of investigation. Requiring as it does from three to six days to produce an appreciable growth, even after having been accustomed to growing on artificial media, and being fastidious as to its oxygen requirements, it is easily outgrown and overwhelmed by other organisms. Its growth is very tardy and sparse when the attempt is made to transplant it from tissues to media and when contaminating organisms are abundant, this attempt usually results in failure.

MUTATION FORMS. An additional perplexity has recently been added, in that there is a possibility of mutation forms. Alice C. Evans of the Dairy Division has discovered, in the milk of certain cows, an organism which culturally and morphologically seems to

be the *B. abortus*. But when these organisms were tried in our laboratory against pathogenic strains by the agglutination and complement fixation tests, they failed to react. Feeding and inoculation tests were also inconclusive. These organisms possess the power of decomposing butter fat, and therefore have been given the name "*B. abortus*, var. *lypolyticus*."

The most interesting of Evans' findings, however, is that a strain of *B. abortus* from pathogenic sources, furnished by the Pathological Laboratories, after having grown from nine and a half months in a medium containing butter fat has acquired the same fat-splitting property. Limited space prevents a detailed discussion, and a report at this time would be premature, but the work will be continued and important results are hoped for.

These findings by Evans and the subsequent work, raise several interesting questions. Several herds where abortions occur occasionally, are under observation of the Pathological Division, but repeated serological tests fail to demonstrate the presence of *B. abortus*. Can it be that these organisms play a causative role in such cases, or are they entirely harmless? Are they attenuated forms of the pathogenic variety, which have lost some of their characteristics as they acquired the fat-splitting property? If this is so, may they not, under certain circumstances, regain their pathogenic properties? Are they detrimental to human health?

The statement has been made, in advertising matter of firms who manufacture biologic products, that 5% of abortions are normal or natural. Abortion is an unnatural phenomenon, for which there is a definite cause, and therefore any abortion from specific causes cannot logically be considered normal. There can be no doubt that the Bang bacillus is responsible for by far the largest percentage of cases, and 5% of non-specific abortion would seem excessive. Our experience, however, would lead us to believe that there may be some other organism, of which we know nothing at present, which may eventually be found to cause abortion in at least part of these cases. For this reason, importance is attached to Evans' findings, and this possibility will have to be considered in future work.

IMMUNITY. The question of immunity is of the utmost importance, and when a working knowledge concerning its principles and means for inducing it artificially shall have been obtained, a great step toward the control of the disease will have been taken.

Some investigators claim that no immunity is established and one claims that whatever of immunity there is partakes of the nature of age immunity. But the literature records numerous instances where cows as old as fifteen years have aborted, and if there is an age of immunity, they surely should have been protected. In favor of this contention is cited the fact that heifers in first pregnancy most frequently abort. One would naturally expect the heifers to abort when placed in an infected environment, just as older cows do. In an infected herd, the older cows have doubtless already acquired immunity, leaving the oncoming generation as the only susceptible material, and for this reason the higher percentage of abortion in the young animals is more apparent than real. It is moreover a very significant fact that even among young cows abortion occurs but once in much more than 50% of the cases. Whether this be called immunity or by some other name, there is unquestionably some protective agency, and for all practical purposes we must recognize this condition as an acquired resistance against the disease. For the above reason, therefore, there is a constant tendency for the disease to die out in an infected herd, provided susceptible material is not introduced into the infected environment. A striking illustration is furnished by the herd at the Government Hospital for the Insane, at Washington. Dr. J. P. Turner has had charge of the veterinary work for sufficient time to make his observations valuable. While cows were being purchased, and susceptible material thus added abortions were frequent, but as this practice was discontinued and the calves born in the herd were raised, the disease progressively decreased, until at the present time abortion is rare. A definite herd immunity seems to have been established. This has an important bearing upon control measures, and is the principle underlying one of our recommendations which will be referred to later. Moreover, the work of the English commission has shown that a serviceable degree of immunity can be induced by the injection of living organisms several weeks before breeding.

SEROLOGICAL TESTS. The agglutination and complement fixation tests are to-day accepted as the only reliable means for detecting in a routine way the presence of the infective agent. Bacteriological examination and guinea pig inoculation may be used, but negative findings in the one are inconclusive, and the other requires too long a period for the development of lesions. The lat-

ter are useful, therefore, only in experimental work. The serological tests are not infallible. The difficulty lies in the fact that both the infected animal and the immune one, which no longer harbors in its body the causative organism, may react. Nor does a reaction indicate that an animal has aborted or that it will abort. Immunity may have been acquired, without the occurrence of any visible manifestations. Also an aborting cow may sometimes fail to react. The use, then, of these tests as diagnostic agencies for detecting the presence of the infection in individual cases, for the purpose of sanitary police control, cannot be relied upon. They are valuable as an indication of the presence of the disease in a herd, and in experimental work, but all other factors must be considered in arriving at a correct diagnosis.

The part played by the bull in the dissemination of the disease is at the present time a very vital question. The papers presented this afternoon have undoubtedly shed some light upon this subject, but much remains to be discovered. Mechanical transmission is accepted, but whether a bull with systemic infection, i. e., assuming that a bull which reacts to the serological test is systemically infected, is capable of injecting the organism with his semen must be determined not only with a few experimental animals, but by extensive breeding experiments.

TIME AND METHOD OF INFECTION. The time when infection takes place, whether in calfhood, before, or after conception, is also important, and some light may be thrown on the subject by a study of results obtained by the Pathological Division in testing large numbers of animals.

A report of the examination of a herd consisting of more than two thousand head of Jerseys may be of interest. It is a mixed herd consisting of approximately one-third purebreds and the remainder grades. An office force is maintained and careful records of pedigrees, breeding, calving, etc. are kept, all of which facilitates investigation. The owner called on the Bureau for assistance in combating abortion, and placed his herd at our disposal for experimental purposes. The herd is located in the southwest and is kept under semi-range conditions. It is divided into units, each unit having a pasture of several hundred acres. The cows are kept in the open except when driven to the milking sheds twice a day. Pasturage is supplemented by ensilage and cottonseed cake. Blood samples were taken from all female cattle of breeding age, the

serum poured off and carbolized to one-half of 1% and forwarded to the pathological laboratories at Washington, where the agglutination test was applied. In addition a study was also made of the herd records to determine such points as the number of abortions, difficulty in breeding, number of live calves, etc., and the following is a résumé of the results noted:

Of the 413 cows which have produced calves, 159 or 38.5% aborted, and of these, 120 aborted once, 35 twice, and four three times. An explanatory statement should be made here. Fifty-one of these cows were of an age to have produced one calf, 56 two calves, and 53 three calves, so that there has not been opportunity in all cases for repeated abortions. Fifty-eight of the 120 cows which aborted once gave a positive reaction and eight were questionable, and of these 66, nine showed difficulty in breeding. Fifty-four aborters gave negative reactions and three showed difficulty in breeding. Thirty-five aborted twice, 27 being positive and three questionable, and of these, two showed difficulty in breeding; five gave negative results and showed no difficulty in breeding. Four cows aborted three times, three of these reacting positively and one negatively, but no difficulty in breeding was recorded. Twenty-five cows showed difficulty in breeding without aborting, and of this number ten gave positive reactions, 12 negative and three questionable. Sixty-six reacted positively without showing other evidence of infection. These figures are not absolutely accurate, as, according to our custom in infected herds, all difficulties attending parturition, whether they be premature birth, weak calves which died a short time after birth, etc. are classed as abortions. Furthermore, these cattle are tick-infested, blackleg prevails, and conditions which are found in arid regions may have had an influence, so that if each individual case could have been investigated by an expert, some would doubtless have been attributed to these causes, rather than to the infection of abortion. These factors would also account for our failure in numerous instances to get positive reactions in cases classed as abortions. In many instances the negative reactions are doubtless due to the long period intervening between the abortion and the application of the test. A study of records of aborting cows which reacted negatively shows that much the larger percentage aborted at from one and one-half to four or five years before the application of the test. Evidently the agglutinins have disappeared from the blood, but this is not a constant occurrence, as some give a reaction even after three and a half years.

In regard to time of infection, particularly in reference to infection shortly after birth, the cows born during 1911 offer interesting information. It is the practice on this ranch to separate the heifer calves from the herd as soon as they can sustain themselves, and thereafter they are kept in pastures apart, where they are bred. They do not rejoin the herd until they are about to calve. They are thus kept in an environment free from the infection of abortion, after having had ample opportunity to acquire it by association with infected mothers and the ingestion of infected milk. There were 41 in this group and 15 aborted. Nine of this number aborted in 1915, after having produced two normal calves each and one three calves. One aborted twice, having produced one calf, and one aborted three times, and one once, without living offspring. Three aborted in 1914, after having calved normally. If it is a fact that calves acquire the infection shortly after birth, and the organism remains latent in the animal's body, awaiting the period of pregnancy to produce its specific action, it is strange indeed that abortion should not have occurred before the second, third or even the fourth pregnancy. These facts seem to contradict strongly the contention that infection is to a considerable degree acquired during calthood. If additional evidence is desired on this point, it is furnished by the results of the agglutination test applied to other young animals of the herd raised under the same conditions. Beginning with those born after July 1st, 1913, which were therefore not old enough to have produced living calves, and had not rejoined the producing herd, 163 were tested, of which only eight reacted and five were questionable. In addition, there were five abortions. All of these reactors but one had been served by bulls which were not known to be clean. Approximately the same ratio of reactions occurred in the larger herd of young grade animals.

The question of time of infection having been considered, the figures may give an indication of the avenue of infection. The young animals, bred to infected bulls, reacted and aborted to but a limited degree, and even after the second copulation with bulls which had been serving infected cows, abortions seldom occurred. On the other hand, it would seem that cohabitation for a considerable period, where opportunity for ingestion is afforded, is necessary for the maximum production of abortion.

The question of the infection of calves and of bulls, being considered very important, yet another attempt was made to obtain

information. Numerous samples of blood were collected from calves and bulls at the abattoirs of Philadelphia, Baltimore, Washington and Richmond. Instructions were given to choose animals of dairy breeding only, and from nearby points so far as possible, in order to get material from infected areas.

One hundred eighty-two bulls over one year of age were tested, of which 10, or 6%, were positive and six were questionable. Out of five hundred twenty male calves, up to one year of age, seven gave positive and four gave questionable reactions, while of 299 female calves of like age, two positive and two questionable reactions were obtained. The fact is recognized that these animals were from unknown sources, yet in view of the wide distribution of the disease in those sections, it is assumed that most of the animals had come into contact with the infection. The results of the test therefore gave an indication of the degree to which those classes of animals harbor the infection.

IMMUNIZATION. For many years efforts have been made to devise means by which animals may be immunized against this disease, and Bang, Jensen, Holth, M'Fadyean, and Stockman have expressed the view that it is possible to establish an immunity against abortion infection by artificial inoculation. A large amount of experimental data has failed to establish a definite result.

The injection of live abortion organisms either intravenously or subcutaneously gave promise of effective immunization, especially when the same had been administered weeks or months before impregnation. If intravenous injections are made less than two months before breeding such treatment may become dangerous, since the animal may become infected to such an extent as to cause an abortion. The intravenous injection is usually accompanied by a febrile reaction, which lasts for several days. The subcutaneous injection has a much milder action, and experience has proved that the subcutaneous injection is not sufficient to protect the animals against heavy feeding of infectious material. Neither of the methods proved effective in immunizing animals to such a degree that they would resist an intravenous infection, but it must be recognized that under natural conditions the animal does not become so heavily infected.

In considering the literature on the results of immunization the reports are very conflicting, although more recent investigations in immunizing with live cultures are especially encouraging,

and it is understood that this method is now being employed on a large scale in England. It must be recognized, however, that the injection of live cultures would be advisable only in more or less severely infected herds, since the animals injected may possibly become disseminators of the infection, at times even for a period of years. This is the main reason why the treatment with live organisms should be cautiously undertaken. It appears that if the disease in a herd is thoroughly established, and the number of abortions, together with the serological tests of the animals show a great proportion of infection, the treatment with live organisms might be justified. On the other hand, where abortion makes its first appearance, and good results might be obtained by isolation of aborting animals, together with the enforcement of strict sanitary precautions, this procedure should be preferred. At any rate, our knowledge as to the effect and results from the injection of live cultures is not sufficient to warrant its unrestricted application.

Immunization with abortion bacterins is now being widely advocated by manufacturers of these products. The results obtained do not warrant the confidence which is expressed in the literature and advertising matter. Considerable experimental work has been conducted by the Bureau of Animal Industry on the effectiveness of bacterin treatment, and while the results were somewhat encouraging, nevertheless generally good results cannot be claimed for such a procedure. In view of our findings, and also those of other investigators, the claims made for the bacterins are unwarranted, and will not serve any good purpose in the control of the disease. Veterinarians will be prone to accept the statements made by the manufacturers at their full value, and possibly disregard other effective means by which the disease might be combated. It is possible that further investigations will establish a more effective method of immunization, but at present the bacterin treatment should be regarded as second in importance to proper sanitation.

We are also preparing immune serum with a view to applying the same in infected herds, either in the form of a simultaneous treatment with dead and living organisms, or in other combinations.

From time to time, medicinal preparations are exploited as effective cures for abortion. Thus carbolic acid has been widely recognized as an efficient remedy, and more recently methylene blue was also heralded as a certain preventive and cure. Proprietary remedies are also extensively advertised, both for prophylactic

and curative purposes, accompanied by glaring testimonials from veterinarians and stock breeders. Up to date there is no supporting evidence available for any of these preparations, and it must be acknowledged that there is no therapeutic treatment known at present, which would either prevent or cure infectious abortion. Accordingly attention should be primarily directed towards prevention by sanitation.

SUGGESTIONS FOR THE CONTROL OF ABORTION. The herd should be tested and all reactors should be kept under special observation. Any animal showing signs of abortion should be immediately removed from the herd and kept under strict isolation until all evidence of uterine discharge has ceased.

The disinfection of animals is performed as follows: To prevent the bull from carrying the infection from a diseased cow to a healthy one, first clip the tuft of long hair from the opening of the sheath, then disinfect the penis and sheath with a solution of one-half per cent of liquor cresolis compositus, lysol, or trikresol, or 1 per cent creolin or carbolic acid, or 1 to 1000 potassium permanganate in warm water. The only apparatus necessary is a soft rubber tube with a large funnel attached to one end, or an ordinary fountain syringe and tube would serve the purpose. The tube should be inserted into the sheath and the foreskin held with the hand to prevent the immediate escape of the fluid. Elevate the funnel as high as possible, and pour in the fluid until the preputial sack is filled. In addition to this, the hair of the belly and inner sides of the thigh should be sponged with the antiseptic. This disinfection should invariably precede and follow every service.

The aborted fetus, membranes, and discharges are particularly dangerous and should be gathered up and destroyed immediately by burning or burial in some safe place, and this followed by thoroughly disinfecting the stall. The uterus of the aborting cow should be irrigated daily with one of the antiseptics mentioned for the bull, using the same apparatus, and the irrigation should be continued until the discharge ceases. Irrigation which does not cleanse the uterine cavity is useless. The irrigation should be discontinued, however, when the os uteri becomes firmly closed, as forcible entry may do more harm than good. In addition, the external genitals, root of tail, escutcheon, etc., should be sponged daily with a solution twice as strong as that used for irrigation. Should the preliminary symptoms of abortion be detected, the animal should be removed from the herd and treated as above.

After abortion, breeding should not again be attempted within two months, or until the discharge shall have ceased, as the uterus would not be normal and the animal would either not conceive or would abort again in a short time.

Great care should be used in purchasing cattle, and cows not known to be free from the disease should be kept in separate quarters until this point is determined. If a herd bull is not kept, then great care should be exercised to know that the animal used is free of disease and to see that he is properly treated both before and after service.

Whenever it becomes necessary to separate diseased and healthy animals, it is especially important that different attendants and utensils be provided for the two groups.

It is not advisable to dispose of cows which have aborted. Such a practice, aside from spreading the disease, is economically unprofitable in view of the fact that the proportion of second abortions is relatively small, and because the animals which have acquired a resistance are more valuable, in an infected herd, than newly introduced, susceptible animals.

Should an aborting animal prove unprofitable as a result of sterility, repeated abortion, or otherwise, it should be utilized for food purposes.

With our present knowledge of the disease, the inauguration of restrictive measures with regard to interstate or intrastate movement of affected cattle for breeding purposes, is not practicable, but such movements of cattle should be discouraged by veterinarians.

DISINFECTION. Premises known to be infected should be periodically and thoroughly disinfected, and this practice should also be repeated after each abortion. The following procedure is suggested:

1. Sweep ceilings, side walls, stall partitions, floors, and other surfaces until free from cobwebs and dust.

2. Remove all accumulations of filth by scraping, and if woodwork has become decayed, porous, or absorbent, it should be removed, burned, and replaced with new material.

3. If floor is of earth, remove four inches from the surface, and in places where it shows staining with urine a sufficient depth should be replaced to expose fresh earth. All earth removed should be replaced with earth from an uncontaminated source, or a new floor of concrete, which is very durable and easily cleaned, may be laid.

4. All refuse and material from stable and barnyard should be removed to a place not accessible to cattle or hogs. The manure should be spread on fields and turned under.

5. The entire interior of the stable, especially the feeding troughs and drains, should be saturated with a disinfectant, as liquor cresolis compositus (U. S. P.), or carbolic acid, six ounces to every gallon of water in each case. After this has dried, the stalls, walls, and ceilings may be covered with whitewash (lime wash), to each gallon of which should be added four ounces of chloride of lime.

The best method of applying the disinfectant and the lime wash is by means of a strong spray pump, such as those used by orchardists.

This method is efficient in disinfection against most of the contagious and infectious diseases of animals, and should be applied immediately following any outbreak, and, as a matter of precaution, it may be used once or twice yearly.

6. It is important that arrangements be made to admit a plentiful supply of sunlight and fresh air by providing an ample number of windows, thereby eliminating dampness, stuffiness, bad odor, and other insanitary conditions. Good drainage is also very necessary.

Recent investigations on the germicidal value of various disinfectants on the abortion germ demonstrated that a combination of hydrochloric acid and salt solution in a concentration of one part of hydrochloric acid, eight parts of salt to 100 parts of water, proved most effective. This combination kills 48 hour agar cultures of the Bang bacillus in one-quarter of a minute, whereas other disinfectants are much slower in their action.

A proper and careful execution of the outlined procedure will, in most instances, insure the eradication of abortion from infected premises. In this regard, however, it should be emphasized that spasmodic efforts are of no avail, and a persistent systematic attention to details is essential in the effort to subdue this great scourge. Veterinarians should direct their most earnest efforts towards giving stock owners proper advice for the control of the disease, and they should especially instruct owners of infected herds of its dangerous character, and urge them to spare no efforts in carrying out minutely all sanitary measures which with our present scien-

tific knowledge of the disease have proven the effective weapons against this contagion.

SUMMARY. Abortion is one of the most destructive of animal diseases.

It is spreading rapidly and has extended to the open range, where its control is especially difficult.

The difficulties connected with its investigation have prevented the solution of many questions which must be settled before further progress can be made.

The question of immunity and methods for inducing it is attracting most attention at this time.

There seems to be a definite tendency toward herd immunity where the increase is drawn from the herd itself and susceptible animals are not introduced.

The serological tests are our most reliable diagnostic agencies for routine work, but they are not infallible and in the present state of our knowledge cannot be used in sanitary police control.

The part played by the bull and the time at which infection takes place are problems which have not been solved satisfactorily.

The infection of female calves shortly after birth, and the persistence of this infection until parturition, seems to be a negligible factor.

The use of biologic products is still in the experimental stage, and veterinarians employing them should not neglect proven methods.

Claims made for so-called curative and preventive preparations are largely unfounded and extravagant.

Sanitary measures and control of breeding are still our most reliable means of overcoming the disease.

DISCUSSION OF THE PAPERS ON ABORTION

DR. V. A. MOORE: I feel very sure that what you need at this time is either a philosopher or a prophet to interpret the results and the findings that have been so carefully presented to you this afternoon. I do not believe that it is desirable to attempt to summarize the very large amount of data that has been presented, the results of observations and experiments that have simply tended to accumulate information bearing on the phenomena of infectious abortion. This disease certainly is one of the most important that the veterinarian has to meet. It is one of the most serious diseases of cattle, and the one that threatens the cattle industry of the country most of all.

I am sure, from what has been said, that a large amount of careful observation has been made, but I confess that I am still in doubt as to the interpretation of much of this experimental data. I have worked with this disease myself. I came to feel confident through experimentation that I knew how to produce abortion, then I repeated the experiments only to find it could not always be done.

I believe after all that the questions before us are to determine first the general distribution of the abortion organism. We have a tremendous number of hypotheses concerning this disease and its etiology. Is the germ of infectious abortion a widely distributed organism, infesting large numbers of places in such a mild and attenuated form that its presence is unrecognized for long periods of time? Do the outbreaks that occur come from the introduction of virulent organisms at that particular time or have they been lying dormant for a longer period? This is a great biological problem that can only be solved by a long series of careful and fundamental bacteriological investigations.

The next question that we have to deal with is the virulence of the organism. From different outbreaks apparently different strains of the organism are isolated, some being more virulent than others. What are the influences that tend to its acceleration or to its attenuation? These are questions of which we have very little knowledge. Then there is the method of infection. How are the animals infected? We have heard much of the various methods today, but which is the one, or is there *the* one? Is this organism introduced through the generative tract solely, and if so, at what time? Is it introduced through the digestive tract solely, and if so, when?

The experiments with the feeding of milk are most interesting. The observation Dr. Williams has made that calves fed upon milk from cows that have aborted, abort in their first pregnancy is significant. These are phenomena that have been observed. What is the interpretation of them?

Then there is the question of the bull. When I hear this topic mentioned I am always reminded of the farmer who lives in our vicinity and who comes to see me once a year to discuss this disease. He has a herd of cattle, and his brother on an adjoining farm has a herd of cattle. He does not have abortion in his herd, but his brother is constantly troubled with it, and yet they use the same bull for both herds. More knowledge is needed on this part of the subject.

Then we have the question of immunity. Do animals possess an immunity to this disease? Do heifers that abort in their first pregnancy and perhaps, second one also, cease to abort? If they do, has immunity been established by means of or through the agency of infection, or is it an age immunity? It does not make much difference which position we take on this subject for we can find plenty of data to support it. However, these are the ques-

tions that are before us; and it seems to me that, serious as the problem is, the work that must be done must be basic and fundamental in connection with the etiology of the disease, and with the reaction of the animal body to the infection.

I do not believe that I am able to give you any further information on this subject or any interpretation of the many facts that have been presented in the excellent papers that you have heard this afternoon. We are simply confronted with a very serious phenomenon and with a large amount of data. The solution of the problem rests in the united effort and cooperation of clinicians and laboratory workers.

DR. ROBERTS: The problem is with the practical side. For three years we have been investigating this subject in our state of North Carolina. We have been hearing of a few abortions, of a few retained placentae, and a few sterilities. If a maximum quantity were in one herd then the owner would be sufficiently interested, and would try to do something for it. He is unable to associate these different entities belonging to the same trouble. Therefore, he is not willing to undertake any means of control. On the other hand, in many instances, we believe it would be wise for him to do so from a financial standpoint. We recognize that it is very hard in our State to control these things. Some abortions we believe are due to the specific infection of the abortion organism. In most instances the limited numbers of cases are such as to make it of financial importance for him to let it alone; because if he undertakes to treat it and go through with what has been and what is recommended, it will be of more financial loss to him, in many cases, than will the abortion and the retained placentae and the sterilities. This is not speaking for all, but this is the general average. We have some of our veterinarians actually reporting from 50 to 75 per cent of their herds as temporarily or permanently sterile. In such cases, they are necessarily interested. Likewise, there are others having from 50 to 75 per cent of their offspring abort, and they are sufficiently interested to do something for it. But the biggest percentage of our people are having the limited number of abortions, retained placentae or metritis, and sterilities. From a financial standpoint, it is a question with me as to how far we could go in advocating what has been stated here, and what has been given before along the line of cleaning up the premises and cleaning up the animals that are themselves infected.

DR. WILLIAMS: I would like to explain the use of one word in which Dr. Hadley has apparently misunderstood me. In my writing I have said that cohabitation does not readily cause the spread of the infection of abortion. In the use of that word I have taken it in its fundamental and etymological significance, as the cohabitation of animals in a given stall or in a given enclosure, and has nothing whatever to do with sexual contact. Dr. Hadley has misinterpreted the meaning which I attached to the word.

There has been much said during the discussion this afternoon, and there is much said in our literature regarding the reaction of the serological tests. I would like to ask Dr. Hadley what constitutes a positive reaction?

DR. HADLEY: I mean that the blood serum of the animal under test, in the case of the agglutination test, agglutinates the corpuscles, used as an antigen. In the complement fixation test, I mean fixation of the complement by the specific antibodies.

DR. WILLIAMS: You did not get my question. In speaking of the reaction of the agglutination tests, what is the proportion that you consider a positive reaction?

DR. HADLEY: We have interpreted the positive reaction in the agglutination test when one-thousandth c.c. of undiluted serum agglutinates one cubic centimeter of the suspension or agglutinated antibody. Is that your understanding, Dr. Eichhorn? How do you interpret it?

DR. EICHHORN: The quantity presented by Dr. Hadley is somewhat higher than the one they accept.

DR. WILLIAMS: I would like to follow that with another question. What scientific foundation have you for fixing that basis? Why is it not just as good evidence, why is it not just as positive a reaction if you get a reaction at one to ten, as if at one to one-thousandth? What is the difference? What scientific basis have you for differentiating?

DR. HADLEY: As in other cases of this kind, I think it is largely the result of experimentation, not altogether I am frank to say on my part, but on the part of the pathologists of the Bureau of Animal Industry; and men like Drs. M'Fadyean and Stockman and investigators of the New York State College of Veterinary Medicine. I think it is generally accepted that the reaction is positive when we get a certain agglutination with a certain amount of serum. I have no specific information to show that a smaller or a larger amount would not be accepted as a positive reaction any other than that based on experience.

DR. EICHHORN: I would like to answer the question of Dr. Williams as to the titre which is considered as a positive indication of the infection; I think we have to accept the word as applied to other infectious diseases. For instance, in glanders, we know that an animal normally will give an agglutination titre of say .125 in glanders, or somewhat higher; and only in exceptional cases will this titre exceed or approach 1-2000. In the same way the normal agglutination titre for the other organisms is also determined. And for abortion, we generally concede that an agglutination titre of 1 to 50 is highly suspicious of the infection, and 1 to 100 is considered invariably as indicating abortion. This is, of course, determined by thousands and thousands of tests not only in

one laboratory, but by all other investigators throughout the world. We ought to accept the data which amounts probably, by this time, to many millions of cases as satisfactory for the determination of a titre which should be accepted as an index.

DR. MERILLAT: I have nothing to say on this question particularly, except, as one of the promoters of this symposium, I want to suggest, at this time, before the discussion closes that these papers, which are too voluminous to digest in a few moments, be published in one or at least two consecutive numbers of the *Journal*. Then they would be more available for reference by those who are here, as well as the 1700 members of the association who will want to analyze very carefully all of these splendid papers and discussions that will follow them.

DR. J. P. TURNER: After hearing this discussion, from a bacteriological standpoint, and from the standpoint of the investigators, it has seemed to me that the average practitioner will go home with the most pessimistic ideas and that he had better lay down on this question; that contagious abortion has really beaten him. It occurred to me just prior to my departure from home to look up the records of a herd that I have had under observation for 16 years, a herd of about 200 grade cows, the herd from which Mohler and Traum made their original investigations of contagious abortion, and the herd from which Schroeder and Cotton made their experiments along the milk lines. That herd did not breed its own calves and did not raise any heifers until 1908; and from 1900 to 1908, cows were purchased each year. Each June, at the end of the fiscal year when money was available, about 25 to 30 cows were purchased. Those cows were close springers or fresh. Those cows would abort about March or April. They would be bred the following September, and abort in April. At that time, we had 25 to 35 abortions a year, and with the usual accompaniments of retained placenta, septic metritis and scours in calves. The high price of cows, and the scarcity of good milch cows forced us in 1908 to begin raising our own heifers. We immediately proceeded to raise every heifer that was born healthy, and used full blood bulls, of course. At that time the herd consisted of about 150 cows and it now consists of about 200 cows and about 100 heifers. I will say that abortion has existed in this herd for over 20 years. It is interesting to note that in 1910, we had 18 abortions. Most of these were tested by the Bureau, that is, the blood was tested, and in all those cases we considered them as contagious abortion cases, and so treated the cows. In 1911, we had 14 abortions, and it is interesting to note that 1911 was the last year we purchased any cows for increasing this herd. In 1912, we dropped to 13, just one less in our abortions. In 1913, we had 9 abortions. In 1914, 6 abortions. In 1915, 3 abortions; the herd gradually increasing until it has reached its maximum of about

200 cows and about 100 heifers of all ages. Up to the date of my departure this year with 200 cows and 100 heifers we have had 3 abortions; 2 of those three were cows aborting at eight and a half months. The calves were both alive, but died. One of them was a three and a half months abortion. Blood was drawn from all of those cows, those three by Dr. Potter, and put through the complement fixation, with negative results.

That is interesting from the standpoint that I believe we will always have abortion in a herd as long as we continue to bring in fresh material.

As to the abortions among the heifers which we have raised. We have raised now 168 heifers which have been in milk from the first calf to the sixth. Contrary to the opinions offered this afternoon, our abortions among those cows raised in the herd have not occurred with the first calf. We have had 14 abortions among these 108 heifers raised with the herd, and of those 14 abortions, three occurred with the first calf. Of these three, all have calved successfully since, and none of these three have been sold. They have turned out to be very good milch cows. With the second calf we had four abortions. One of these had a live calf before this abortion, and after it aborted the second calf was sold as unprofitable; that is, we figured that unless they make two and a half to three gallons after the abortion, we had better sell them. Another one of those four has been sold as unprofitable, but the other two have been kept as profitable cows. With the third calf, five have aborted. All of these five have been retained in the herd as profitable cows. With the fourth calf we have had one abortion. With the fifth calf none, and with the sixth, we have had one abortion. This cow was unprofitable and sold.

This has absolutely no scientific interest, except to draw out these conclusions which have always obtained with me that the control of abortion in a herd lies in just these facts, that as long as we buy cows we will have abortions. New cows will always keep the disease in your herd. It is also interesting to note that all these heifers received and were raised on abortion milk. Certainly Schroeder's and Cotton's experiments showed that the herd was permeated; that all of the samples of milk showed contagious abortion. Ten years ago when we were raising heifers, we had five or six aborters at one time in the quarantine pens. We could not throw that milk away. We fed it to the heifers; and whether or not we got a self immunization of that herd, I do not know, but we do not have any more abortions. We have not used any of these radical measures of disinfecting cows for a month or so before breeding. I dare say that some of you would think these cows were not cared for very well. They have been brought in, some of them, in a rather dirty condition, but we have paid special attention to cows which have aborted. We have burned the abortions; we have separated the cows; we have kept them separated in concrete

yards for a month or two, sometimes three months; we have disinfected them thoroughly; we have disinfected the stables. We have not paid any attention to disinfecting the bull. We kept one bull for that purpose, because it was too much bother to keep constantly disinfecting this bull. This old bull is now ten years of age, and this last year, after cleaning him up thoroughly and disinfecting him, I put him back into the herd, and his impregnations have been coming along regularly. I have bred him to these aborted cows. It has impressed me that we may get some self immunization in our cows in these herds. Another thing which has impressed me is the fact that, when we raise our own heifers, those of us who do not have to depend upon the market, we will certainly solve this question. I believe that it is necessary to thoroughly disinfect and keep a place clean in order to produce these results.

DR. ROBERTS: In that particular herd in North Carolina, the big thing with us is that sterility more than anything else is the cause of 99 per cent of our losses.

DR. TURNER: As I said, you notice the figures of the 14 which had aborted. I sold three because they were unprofitable. We have had some sterility, but as the herd has disappeared from the purchased herd into the raised herd and they are young cows now, we have had very little sterility.

Another interesting fact. Dr. Williams is well acquainted with the herd; and we have no abortion at the present. I believe we had one case last year. Dr. Potter drew 115 samples of blood recently, and found one positive reaction. It is interesting to note that that cow was purchased in New York 8 years ago; had a calf about four or five months after being purchased, and has since produced a live calf each year; and, since the sample of blood was drawn, has had a good, big, husky calf, which has been sold for \$150. We are very well pleased with the situation as far as contagious abortion is concerned in these two herds.

We have had some other trouble which goes along with contagious abortion, one or two outbreaks of infectious metritis, with the loss of five or six cows, but in this herd we have had very little sterility. The sterility last year was practically nil. I think that 72 calves, in the one fiscal year, out of 82 dams is a fairly good record of production. I think it can be said that we have not very much sterility; and I feel very well satisfied that if the veterinarian has absolute charge of veterinary matters in a herd, and if he is not interfered with by the herdsman, or by owners with superficial ideas, he will be successful; but, if the veterinarian is simply called in by the visit, or if he is simply paid a little sum by the month, and little or no attention is paid to his efforts, there will be no success. If owners of fine herds wish success, they must put this matter entirely into the hands of their veterinarian and get the proper results.

DR. MERILLAT: One author in this paper, recommended the immediate removal of the placenta when it was not too stubbornly attached. I would like to know what is his management of the stubbornly attached placenta? I do not remember which one of the papers stated that, but I think it was Dr. Cotton's.

DR. COTTON: I made that statement. I think I am the guilty man. We all know that in contagious abortion, the afterbirth is retained; oft-times it is almost impossible to remove the placenta except by severe traction, pulling and separating of the cotyledons; and when we do that, we leave trouble with the uterus afterwards; and I think we have all been a little bit too anxious in the past to tear and pull at the placenta. I know I have been. Sometimes we wait for a week, and then undertake to remove it. I think this is a mistake, because the cervix contracts, the walls of the uterus remain flaccid, and we cannot get at it. But, I do believe if we can take it away without too much force, we should do it.

When we are unable to remove it, in order to prevent any increase of infection, I think we should flush the uterus and continue it weekly at least, oftener if possible, until such time as the placenta separates itself and comes away with the discharges. I think it is wrong to put too much traction on it.

DR. ———: (Utah): A word might be added in reference to the placentae that are retained and will not come away with ordinary traction. I think the same holds true here, as with the handling of the proposition as a whole, that there is no one rule or procedure that will apply by any means. There is no one rule that will apply in regard to the strength of the disinfectant, or the times of disinfecting. One disinfectant seems to work marvels in one case, and does not in the next. If it does not irritate one cow, it does another. It works better on one cow than it does on another cow. Where the placenta does not come away, we find, in our experience, that it is best to leave it alone, unless it will come away very easily. Where it is retained, place an iodoform capsule in the uterus, and leave it entirely alone; it will come away and take care of itself. That has been our experience in a few cases, and I am inclined to think that we will have no occasion to change the procedure. I am not certain but that it is the best way to follow where they do come away easily, simply insert an ordinary ounce capsule half full or full of iodoform; that seems to prevent putrefaction; and you go back in three or four days or a week, and have no evidence of putrefaction existing. We did that the other day with a cow that had a fetid fetus, which was removed, and there was no irritation whatever. The iodoform capsule was introduced and in about four days afterwards the cow was in good condition. There was no dropping off of the milk, no evidence of any bad effects from infection. We have had some extremely bad results from filling up the uterus with a disinfectant with the idea

that this liquid disinfectant would take care of it. It does take care of it in a great many cases, but in some cases the uterus is so flaccid, so torpid, and the cavity is so great that the fluid seems to stay in there, and something happens, I don't know what; cases treated that way go on to a fatal termination in a short time. Whereas, since we have used the iodoform method alone, without any introduction of fluid, except that which was removed immediately, these unfavorable results have not followed.

DR. TURNER: When you introduce this iodoform capsule, do you open the capsule or spread it out?

DR. ———: (Utah): As a rule we just put it in, as far down as we can reach.

DR. TURNER: That was my practice. I don't do it any more. I had a cow die last year that had a capsule—we had three capsules put in the cow, and I found all three of those capsules accumulated in one corner of the uterus. Some mucus had gathered them together. There was no spread at all. The gelatine had not dissolved. Since then I have decided unless I can spread the iodoform through the cow's uterus, it is rather foolish to use the capsules. Contrary to the ideas of most practitioners the uterus is not an intestine that twists and spreads and turns. It is an organ that stays in place, and your capsule stays right there.

DR. DEVINE: It seems to me that pure bred cattle have become such an important factor in our agricultural sections, that this very topic is just as important to the young men as any one thing I know of.

Some 7 or 8 years ago I wrote an article for the *Review*. Dr. Turner wrote me about it afterwards, as did several others, deploring the fact that our colleges turned out young men who would go out and manipulate the interior of the uterus of a pure bred cow the same as they had been accustomed to do on a scrub. To every man I got as an assistant after that, I said in big type that was one of the things he should not do. It cost me a great many nights' sleep, and a good bit of criticism until I found out that men were apt to do that unless I cautioned them otherwise.

I want to say from experience among thousands and thousands of pure bred cattle, and I was built for that business, that any man, who would attempt to manipulate or put traction upon the fetal membranes of a pure bred cow, where there was already infection, is making a serious mistake. If he ruptures one capillary, 99 per cent are liable to go off feed, go down in their milk, and get hemorrhagic septicemia in a more or less developed form, and probably die from it. Any procedure that has ever been suggested to me, or that I have read of, including Dr. Williams' iodoform capsule, has been unsatisfactory in general practice. As Dr. Turner says, we find the capsule undissolved after making the examination. You want to remember that where the membranes are re-

tained, the uterus does not have its normal contraction, and you can readily introduce your hands two or three or four days afterwards into the uterus, and examine and see what your capsule has done, or has not done, about dissolving. In some cases it has dissolved beautifully, where there has been an amount of serum in there, but in some cases it has not. On the other hand, where it has dissolved most beautifully, it has been objectionable in high class stables because of the odor which comes with it, so I had to abandon it.

As to irrigation, some say a week, some say three or four days, but to my mind, that amounts to nothing. A cow with a fetid membrane which is decomposing, needs to be douched at least three times a day, in order to keep down infection and lessen the decomposition, and bring away the membranes; get them out before dripping commences. Another serious thing is that we are all apt to make our disinfectants too strong. You can burn the inside of the uterus very easily. As a matter of fact, if you use only a common salt solution, often enough, perhaps you would get along just as well. But the important thing is to keep the exterior clean with disinfectants, and then when you attempt to irrigate, or teach others to irrigate, be sure you are clean, that they are clean, before they attempt to introduce the solution. I think Mr. Smith's records will show you that I have bought some six or seven dozen stomach pumps within the past four or five years. On every farm I attempt to have one and I attempt to show the herdsmen how to use it. I am not afraid that he will steal my business. If he will irrigate those cows regularly, conscientiously and scientifically, he will do a great service to me and my profession, as well as his own.

DR. CONNAWAY: As Dr. Turner remarked, it seems that at a certain stage, we are all up in the air. I think the report which Dr. Turner gave of his experiences teaches us a very important lesson, one we can take home and apply, and one which the farmers and many of the breeders would like to hear. It is this: Don't disperse a herd that is infected with contagious abortion. The practice in the past has been, when this disease gets into a herd, to hide it, not let anybody know anything about it at all, but proceed to get rid of those animals which have aborted one by one, or later on if it got bad, to hold a sale and disperse the whole herd. I have known many men to do this who ought to be in the pure bred business today, and would be if they had had the proper advice at the right time. I did not know what to advise them, nor did any other veterinarian at that time. Investigations have shown this, observations have shown that this is a disease that tends to immunization of the herd, and if we don't do anything, bye and bye we will have a herd which will raise its calves, and that is what the breeder wants; that is what the dairyman wants; he wants a herd that will raise calves. I know of herds that have had this

disease for 15 or 20 years which at the present time are not losing very many calves. Those old cows still respond, and will show a complement fixation reaction, whatever that may mean, or however little faith Dr. Williams may have in this test, or our methods of applying it. I believe that is a good test, and that we ought, our experiment stations ought, to make this test useful to the breeders to detect the infected herds of the state; to detect in infected herds those individuals that are infected, so they can apply these sanitary measures, segregating these animals and applying those old time remedies, which Liautard and others of his day, 25 years ago, recommended, and which have been recommended here today.

I think finding out where the disease is, the isolation of infected animals, the isolation of the calves, and thorough disinfection of the premises or buildings where they are housed, that by these methods bye and bye we will get rid of this disease. I am quite sure of it. I know of herds that do not have the disease, and the disease has been kept out of those herds simply by being careful in buying the bulls, or probably not so much that, as not introducing any new females into it. That was brought out here, I think by Dr. Turner and probably by others.

I think we are making progress along this line. I believe these scientific investigations, although we have not enough facts established yet, and our interpretations may be at fault, should go on until we find enough facts, and presenting those facts before this association where another man can get up and say that his experience is different, and he does not believe that is a fact; why, we may be convinced bye and bye that some of the things that we think are facts, are not facts; these discussions will help us to get at the whole truth of this matter. Let these investigations go on. Let us come here with our facts or what we think to be facts, and swap them with the other fellow; set them up and let the other fellow knock them down, if he can.

I believe this to be a fact in regard to contagious abortion, a scientific fact of which we have some evidence; that much of this disease is transmitted through the calf. We know that fetuses from cows that abort contain the germs of that disease. We get the cultures from these sources. We also know that some of these calves that are dropped are under-sized; some of them have been carried longer than their due time, and dropped as little, runty calves. Those calves, I have no doubt, carry the germs of that disease. We know that they will show the complement fixation reaction before they ever drink any milk. So I think there is pretty good evidence that the calf has it. We know this in some experiments that have been made at the Missouri Experiment Station, and probably have been made at other experiment stations, that those calves will retain that infection, or at least the antibodies, for 100 days or longer. We have had some that reacted 180 days after birth. Of course, there is a possibility that some of these may have kept up that infection by drinking infected milk, but we

know that they had the infection at birth, and we know that many of them have lost it in five or six weeks, and that some of them will lose that reaction in about 180 days. I think the average on some 15 or 20 calves that were tested was about 120 days. The question is, has that calf lost that infection, or is it simply lying there in a dormant condition awaiting the period of gestation in the case of the female, when the breeding period comes on? In the case of the bull, some of these little bull calves will show that reaction at the time of birth. They lose it. The question is, does the bull retain that infection in its body in a dormant condition, and later on at breeding time, does it creep out again?

We had in some of our experiments this peculiar circumstance. We bought a bull in Massachusetts for an experiment, to breed to some non-reacting heifers; and after we bred him a time or two to cows that had never been bred before, he showed a positive reaction. Where did it come from? This bull had never been bred to any infected animal; never had been bred to an animal that had been served before, and was kept isolated away from infection. So there is this possibility, that it may hold the infection in some organ of his body, possibly in the sexual organs, and along at the breeding period it will break out again. We have much to learn about this, but let the good work go on; and let us bring our facts or supposed facts here and discuss them. One word as to the question of sterility. Here is one of the big questions that is up to the farmers and breeders today. I know of one herd where the man is not raising many calves, and he has no abortion in his herd. His cows simply won't conceive. What are the reasons? I think the work which Dr. Williams has done along this line is going to help us out a great deal on this matter; and that some recent work done in Chicago along human lines may lead us in the right direction. Other infections may be responsible for sterility. In the work of Rosenau and one of his men in one of the hospitals in Chicago, you may recall, they found in cystic ovaries in the human a certain coccus quite constantly along with other bacteria; and they came to the conclusion that these things may have something to do with the sterility in women. One important case was a virgin that had an imperforate vagina, and consequently could not have received the infection through the vaginal tract; on an operation for the removal of the ovaries in that case they found a certain condition—I don't just recall it exactly, but they found some streptococcus in these organs. They made some experiments with these, reproducing the same trouble in rabbits. I brought this up because it is in line with some observations I have made on sterile cows. In one herd where four cows did not conceive, one never had raised a calf, although she had been bred many times. The other cows had raised a few calves and had quit. In every one of these cows we found nails in the reticulum. It is not an uncommon thing to find them frequently in the reticulum. But we found in those four cows evidences of pus infection, perforations in the liver, or

in the diaphragm, and abscesses formed in different parts of the body. So it is possible that we may have in this case the transference through the blood stream to the ovaries, some selective organism that finds its habitat for growth best in the ovaries and in the ovarian cysts.

We may have some of these cases of sterility due to organisms that get to these organs through the blood stream, just as Rosenau and his men have found in the case of the human. Dr. Roberts has asked a question and nobody wanted to answer. The doctor lives down in a region where they feed a large amount of cottonseed meal. Another man from down south told me this story just last night, so I am going to tell it to you now. He said an acquaintance of his up north told him to send up a sack of cottonseed meal. He said he got it and sent it up. The lady of the family ground that up into an emulsion and drank it. The result was an abortion in that case, and with serious results. There is an old notion down south regarding the cotton root. They say old nigger mammies used to use that for abortive purposes. I do not know what success it gave.

DR. ROBERTS: It hasn't any effect on them down there.

DR. CONNAWAY: I think the question of feed is one that we must investigate in relation to sterility.

DR. POTTER: There is one question in reference to this abortion proposition which has not been sufficiently emphasized, and that is, that the man who has no abortion in his herd should be instructed in methods which will keep his herd clean. I believe that this information should be disseminated as widely as possible in order to prevent the dissemination of the disease. The fellow who has it extensively in his herd will take the necessary means of getting rid of it, but we ought to instruct the man who does not have it, how to keep his herd clean.

DR. CASE:—I would like to ask Dr. DeVine a question. He spoke about irrigating the placenta two or three times a day if it is not taken away. I want to ask him how much fluid he injects into a uterus, and whether he has that fluid withdrawn. It has been my experience when I put fluid into the uterus and left the placenta in, that I could not get that fluid out, and I have had several fatal results. I would like to ask how much fluid he puts in there, and whether he tries to get it out again.

DR. DEVINE: I have had that question asked before. One young man last night told me that he feared that from douching a cow he had ruptured the uterus. I would like to see the man that could rupture a normal cow's uterus by simply pumping in water. That simply cannot be done. As to taking out the fluid, that depends. If you have occasion to see a cow that has a mucous membrane that has been held two or three days perhaps, you find it pretty ripe. Of course, we irrigate that, irrigate it and siphon it out until we think we have it clear, or until it repairs. It doesn't matter whether it takes one pailful or ten pailfuls. If there are

any shreds in there, we take them away with our hands. Sometimes the membrane is ready to come out, but we don't attempt to pull it. I say, use just as much water as you choose. I have sometimes used six or seven ordinary bucketfuls, pumped in and then siphoned out. In case, of course, where you have putrefied membranes, you use disinfectants, making each pailful perhaps lighter and lighter. Then finally in such cases you always try to leave in a pretty fair bucketful of normal salt solution, carry those ordinary salt tablets, put them in the pailful, let it stay in unless she rejects it; of course, she does more or less. But we like to leave it in there some time for the purpose of observation. I have never seen a case, and I cannot conceive how clean, sterile water, or water of normal salt solution, or water with a mild antiseptic, can be accused of killing a cow. I cannot conceive of a condition that would lead a man to suspect it.

DR. ———: It has been our experience that they generally die. I do not know why it is.

DR. COTTON: I do not want to see the practitioners leave this meeting today with the understanding that, if they have infectious abortion in a herd, all that is necessary is to advise the owner not to buy any more cattle and leave it alone and they will get a natural immunity and the disease will subside. I do not want them to go away from here with the idea that within a week or a few days after an abortion has occurred, that they can give a stomach tube to the herdsman of a high class, high priced herd of breeding dairy cattle and tell him he can continue to flush the uterus with impunity or immunity. I have killed cows by introducing a hose into the uterus to try to flush it.

I want to tell you again that when four days to a week have elapsed after an animal has aborted, the cervix is so contracted, that it is dangerous to give to a layman any instrument to introduce into the uterus. I also want to state that in my opinion all fluids that are put into the uterine cavity under those conditions should be siphoned out, and if you are unable to get them out that way, put your arm into the rectum and see that you get all of the fluid out of the uterus before you leave it.

DR. DEVINE: I would like to say to Dr. Cotton that no man can get his tube or his hand into the uterus four or five days after the placenta has been removed or has come away without tearing the os open again.

DR. COTTON: Even when the placenta is retained, and the cervix is contracted, I want to still insist that it is bad practice to give a stomach tube to a herdsman with the idea that he will flush the uterus out two or three times a day, or even once a month or once a week. It is dangerous. A practitioner, a qualified man who will go carefully into that cervix, perhaps may be able to introduce a common soft rubber horse catheter, but look out for that stomach tube, or you will have fatal results.

SOME FACTS ABOUT ABORTION DISEASE*

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Most bacterial diseases have two prime or main factors, a pathogenic microparasite and a susceptible host, but infectious abortion disease of cattle is more complex; it has three prime factors, a pathogenic microparasite and two hosts. How imperfect our knowledge about this perplexing evil has remained at once becomes apparent when we stop to think that it has not been certainly determined which of the two hosts, the cow or the fetus, is primarily attacked by the microparasite. That is to say, we do not know whether the abortion bacillus primarily causes a disease of the cow's uterus which leads to the expulsion of the fetus, or whether, in the first place, it causes a disease of the fetus which subsequently impels the uterus to expel its contents.

One of the superlatively important facts about abortion disease is that cows often remain carriers of abortion bacilli long after they have ceased to abort, and that cows which have never aborted and regularly and normally produce seemingly healthy calves, may be chronic carriers and disseminators of abortion bacilli.

As far as we have been able to learn, the abortion bacillus is an obligatory parasite. It may live and retain its virulence a long period of time, as this can be measured through bacteriological cultivation and guinea pig inoculation tests, in infected material expelled from the uteruses of infected cows, but we have no data to support the belief that it can maintain itself or multiply under natural conditions as a saprophyte. Hence, the chronic persistence of the microparasite in the bodies of infected cows probably is the most important among the causes responsible for the propagation, the perpetuation and wide prevalence of the disease.

Another fact is that the favorite habitat of the abortion bacillus in the bodies of cows is the udder, and that the udder is seemingly its only habitat in the bodies of non-pregnant cows. Our work regarding this fact includes hundreds of carefully made tests with milk from numerous cows. Some of the cows had aborted and others had not; the milk of some was infected with

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abortion bacilli continuously and that of others intermittently; that of some cows remained infected year after year and that of others shorter periods of time. In one case, a cow that remained under observation seven years, periodic tests proved the milk to be infected continuously.

There is a fact, related to the expulsion of abortion bacilli with milk from the udders of cows, which is interesting and important not only on its own account, but also because it serves as strong circumstantial evidence to prove that our work on the occurrence of abortion bacilli in the milk of cows is trustworthy. The fact is this, in the numerous tests made, with milk from many different cows, the abortion bacillus was never found in the milk of a cow unless both her milk and her blood serum possessed agglutinating properties for suspensions of abortion bacilli. This does not mean, however, that the milk of all cows which react with the agglutination test for abortion disease is infected; as we have repeatedly tested milk from reacting cows without detecting abortion bacilli.

Regarding reacting cows with uninfected udders we may say, though we wish to have the statement taken cautiously as the evidence behind it is not yet sufficient to give it the rank of a proved fact, their blood serum gradually loses its power to agglutinate suspensions of abortion bacilli.

If this statement on further study should prove true, it, together with other facts, will justify the conclusion that the persistence of agglutinating and complement fixing substances in the blood of cows, relative to abortion disease, is intimately associated with the abortion bacilli that enter the body through the lymphatics from infected udders, as abortion bacilli do not maintain themselves in the bodies of cows elsewhere than their udders and gravid uteruses.

That abortion bacilli do not maintain themselves in the bodies of cows elsewhere than the named regions, is a fact for which we have obtained fairly convincing proof. It was found that abortion bacilli injected into the veins of normal, non-pregnant cows disappeared from their circulating blood in the course of a few hours, and when such cows were killed sometime afterwards, though their blood had become positive with agglutination tests, the germs could not be found in their bodies unless it was in their udders and associated lymph glands. One case in our records of experiments

is remarkably impressive as an illustration of the tendency of abortion bacilli to lodge in the udder. The case is that of an adult, virgin, female animal, a heifer approximately four years old, which was given an injection of abortion bacilli into one of her jugular veins. Later it was found that the infection had established itself in her virgin udder, which was not functioning and never had functioned. We use the term infection here and elsewhere in this paper as signifying the discoverable presence of abortion bacilli, and not as implying the development of observable lesions of disease.

Another series of tests, probably even more convincing than the foregoing, was a careful search for abortion bacilli in the bodies of naturally as distinct from artificially infected cows. The cows were killed and their blood, spleens, livers, kidneys, brains, ovaries, uteruses, udders, milk, synovial fluid from various joints, nerve tissue, lymph glands from all portions of the body, etc., tested for abortion bacilli through animal inoculation and cultural methods, with the following results: In all cases two or more quarters of the udder, the milk from the infected quarters, and one or more supra-mammary lymph glands, and in one instance some of the pelvic lymph glands were infected. All other organs and tissues were invariably free from infection.

When we inject abortion bacilli into the non-pregnant uterus of a cow they disappear in the course of a few days; when we test the discharge from the uterus of a cow which has aborted we may find abortion bacilli for twenty, thirty or even forty or fifty days, but they eventually disappear, and it is our impression that their abundance and period of persistence is intimately related to the magnitude of the lesions in the uterus attendant upon an abortion.

It is our belief that the evidence we have supplied is sufficient to prove the two facts, one, that the udders of cows are a common habitat of abortion bacilli and, two, that abortion bacilli do not maintain themselves in the bodies of non-pregnant cows elsewhere than in their udders. This occurrence of the bacilli in the supra-mammary, and in one instance in pelvic lymph glands, and no further into the body, merely proves that the germs tend to penetrate into the body from the udder through the lymph channels, but that they cannot go very far before they are destroyed.

When we inject abortion bacilli into the udder through the teat, using a method which avoids trauma, we establish the bacilli in the udder, and the cow, according to all available tests, becomes an infected cow.

Now, we have a remarkable and truly important fact concerning the production of calves by cows with infected udders. Such cows, irrespective of whether they have at some time in the past aborted or not, may give birth to seemingly normal calves in a seemingly normal manner associated with the occurrence of abortion bacilli in their uteruses and the afterbirth. We have quite a number of records to prove this; it does not occur every time a cow with an infected udder calves, but is far from uncommon. As we have stated, it may occur with a cow which has never aborted, and it may occur with the third seemingly normal parturition after an abortion. In our experience, though we have made quite a number of tests, this remarkable fact has never been observed in connection with cows which react positively with the agglutination tests but the udders of which were free from infection, and the fact becomes all the more remarkable when we view it in the light of another fact, namely, that numerous careful tests of the uteruses of non-pregnant cows, irrespective of whether their udders were infected or not, tests made both between and during periods of oestrus, in no instance revealed the presence of abortion bacilli.

Another fact which merits consideration in this connection was derived from tests with newly-born calves. A number of calves produced by cows with infected udders, were killed immediately after they were born and their bodies tested for the presence of abortion bacilli through guinea pig inoculation methods. These calves were not permitted to come in contact with their mothers or other sources of infection that would tend to introduce germs into their bodies not present at the moment of completed parturition. It was found that such calves, and we are speaking about calves that were delivered alive and seemingly vigorous and healthy, may harbor abortion bacilli in their stomachs and gastro-hepatic lymph glands, but, invariably, when the calves were infected the afterbirth and the uteruses of their dams were also infected. In aborted fetuses the stomachs, intestines, lymph glands, spleens, livers and blood and subcutaneous extravasations of serum may contain abortion bacilli.

One of our records concerning the injection of abortion bacilli into the udder of a cow, through the teat without trauma, is particularly interesting. The cow was well advanced in pregnancy and according to all tests that could be made was free from abortion disease prior to her injection. We will give this record with

considerable detail, because it impresses us as being very instructive and may, moreover, illustrate the laborious application the investigation of abortion disease requires.

Cow No. 1154. Sept. 9, 1914. Received at the Experiment Station from an abortion-free herd. About 8 years old. Was negative with all tests for abortion disease and was carefully protected against exposure to infection.

Sept. 21, 1915. Served by bull No. 1150 and conceived. The bull was received at the station on the same day on which the cow was received, and was and is now negative with all tests for abortion disease, and has been carefully protected against exposure to infection.

Dec. 10, 1915. Agglutination tests with blood serum from the cow and the bull were made. Negative in both cases.

Mar. 27, 1916. Agglutination tests with blood serum from the cow and the bull were made. Negative in both cases.

You may observe that we speak of the agglutination test over and over again and say little or nothing about the complement fixation test for abortion disease. The reason for this is quite simple. We convinced ourselves that the agglutination test for abortion disease is fully as reliable as the complement fixation test, but far less complex, and, hence, in the hands of those who have many and varied duties, more reliable.

Mar. 27, 28, 29, 30 and 31, 1916. On each of the five days material was obtained from the udder of the cow and injected into guinea pigs. The guinea pigs were subsequently killed and examined post-mortem and found to be free from lesions of the kind caused in guinea pigs by abortion bacilli. In fact, they had remained perfectly healthy and showed no lesions of any kind.

Apr. 3, 1916. The growth on two culture tubes of abortion bacilli was scraped off and suspended in 30 c.c. of sterile normal salt solution and injected into the right front teat of the cow. The method of injection was through gravity, and the pressure used did not exceed that exerted by a column of fluid 12 inches high.

Two guinea pigs were injected with samples of the suspension, and both later showed typical lesions of the kind caused in guinea pigs by abortion bacilli.

Apr. 8, 1916. Five days after the injection, agglutination tests with blood serum from the cow were negative.

Apr. 17, 1916. Two weeks after the injection, agglutination tests with blood serum from the cow were positive with dilutions of 1 to 400, which must be regarded as a very strong reaction.

Apr. 22, 1916. Material from the infected quarter of the cow's udder was injected into guinea pigs, which subsequently developed typical abortion bacillus lesions.

May 3, 1916. Material from each quarter of the cow's udder was injected separately into guinea pigs, all of which subsequently developed typical abortion bacillus lesions, showing that the infection originally introduced into one quarter had spread to the other three quarters. On the same day material from the udder agglutinated suspensions of abortion bacilli in the following dilutions:

Right front, or injected quarter.....	1 to 6400
Left front quarter.....	1 to 1600
Right hind quarter	1 to 800
Left hind quarter	1 to 1600

It is interesting to note how much higher the agglutinating value of material from the injected quarter is than from the other quarters. We do not speak of material obtained from the cow's udder as milk, because the cow was practically dry, and it is questionable whether the material which can be stripped from a practically dry udder shortly before parturition can reasonably be looked upon as milk.

On May 9, the agglutinating value of material from the injected quarter of the udder was positive in a dilution of 1 to 12,800, and on May 15, 19 and 24, in a dilution of 1 to 25,600. On these days the agglutinating value for suspensions of abortion bacilli of material from the other quarters of the udder remained constant for a dilution of 1 to 1600, and that of the blood serum of the cow for a dilution of 1 to 400.

May 26, 1916, or 279 days after service by the bull, the cow produced an undersized, weak calf, which, however, rapidly gained strength and is now a normal healthy, vigorous animal. On the day of parturition the following agglutination tests were made.

Colostrum, injected quarter of udder, positive, dilution	1 to 25600
Colostrum, other 3 quarters of udder, positive, dilution	1 to 1600
Blood serum cow, positive, dilution.....	1 to 400
Blood serum calf, positive, dilution	1 to 400

It is common for newly-born calves of infected cows, when agglutination tests are made with blood serum to react in the same dilutions or quite as strongly as their mothers, but this power to react does not persist, it is a rapidly declining phenomenon, as is well shown by the following tests of the blood serum of the calf concerned in this record.

On the day of its birth, as we have recorded, the agglutination value of the calf's blood serum and that of its mother were identical; positive in dilutions of 1 to 400. June 2, the agglutinating value of the calf's blood had already declined to positive in dilutions no higher than 1 to 200; June 7, it had fallen to 1 to 100; June 9, it was still at 1 to 100, but on July 10 all agglutinating power for suspension of abortion bacilli had disappeared.

Contrary to this, the agglutinating power of the cow's blood serum remained constant for dilutions of 1 to 400. Not so, however, with the agglutinating power of material from her udder. Colostrum, we have seen, agglutinated in dilutions, injected quarter, 1 to 25600; other quarters 1 to 1600. The milk, as early as June 8, a little more than two weeks after parturition, was positive in dilutions no higher than, injected quarter, 1 to 200, and the other quarters, 1 to 50, at which points it remained fairly constant.

Now for the most interesting fact about the cow. Parturition was associated with retention of the afterbirth, which, on removal, was found to contain much abnormal material of a yellowish color, and this was proved to be infected with abortion bacilli. Vaginal discharge from the cow was also proved to be infected with abortion bacilli on June 1, 3, and 12, and free from infection on and after June 20.

This one cow illustrates a number of abortion disease phenomena. First, we see that the introduction of abortion bacilli into the udder through the teat, though a method of injection was used which almost certainly precluded mechanical injury, positively infected it and caused the gradual development of agglutinating power for suspensions of abortion bacilli in the blood serum. In other words, the udder is a possible channel through which abortion bacilli may penetrate into the body.

Secondly, we see that the passage of abortion bacilli from the udder to the uterus is an experimentally demonstrated fact. We have already stated that, in all cases in which we found abortion bacilli in the uterus after seemingly normal parturitions, it was in cows with infected udders, and it is only necessary to add, in practically half of the cows with infected udders we have examined relative to this matter, we found the uterus and placenta infected with abortion bacilli.

One is almost inclined to ask whether abortion disease may not perpetuate itself through abortion bacilli that enter the udder

through the teat. If you will stop to think how cows are milked, and how the milker goes from cow to cow without disinfecting his hands, and that the udders of cows are the commonest and a very common habitat of abortion bacilli, you will not regard the mode of infection suggested by the question too lightly, or as an untenable supposition. We are in no position to claim that a question of this kind is likely ever to receive an affirmative answer, but it is now equally far from a negative answer, and serious investigation must consider all possibilities.

The record of cow No. 1154, in the third place, illustrates another fact; namely, the high agglutinating power of colostrum from cows with infected udders. This phenomenon, together with the rapid decline of agglutinating power of material from the udder as milk takes the place of colostrum, has been repeatedly observed.

In the fourth place, the rapidly declining agglutinating power of the blood-serum of the calf of an infected cow is shown, and this also is a repeatedly observed phenomenon. We have found that we can engender agglutinating properties in the blood of calves by injecting them with abortion bacilli, but such injections must be repeated from time to time otherwise the agglutinating properties of the blood serum disappear.

In the fifth place, as the calf was suckled by its mother, whose udder we know was heavily infected, we may judge from the rapidly declining agglutinating value of its blood that abortion bacilli in ingested milk do not seem to penetrate deeply or abundantly into a calf's body. The records of other cows and calves give similar data.

But we must not impose too much on your patience and good nature by multiplying our presentation of phenomena which, whatever of economic importance they may eventually lead to, still require the most careful study, singly and in their bearing on each other, before they can be woven into a clearly understandable entity.

But there is one other matter to which we wish to call a few moments of attention. We know that it is rare for male and virgin cattle to react positively with abortion tests, and it has been pointed out that the bodies of cows do not harbor abortion bacilli elsewhere than in their udders, associated lymph glands and pregnant uteruses. It does happen occasionally that bulls do react

when they are tested for abortion disease, and what such reactions may signify remains decidedly questionable; hence, the two following cases, may be both instructive and interesting.

Sometime ago we found two bulls which reacted when their blood serum was tested with suspensions of abortion bacilli. In one case the reaction was positive in a dilution of 1 to 200 and in the other in a dilution of 1 to 100. Where the bulls got the infection our knowledge of their history does not reveal.

One of the bulls, the one with the higher reaction, was immediately killed and examined post-mortem. The only lesions found in his body was an abscess involving the epididymis of one testicle, and this abscess was definitely proved to be infected with abortion bacilli. Tests, including all other portions of the sexual organs and various other organs of the body, failed to reveal abortion bacilli.

Was this apparently healthy bull qualified to serve as an active disseminator of abortion disease? We leave you to answer the question, we are not ready to do so.

The other bull was permitted to serve a cow which, according to her history and all tests we could make, was free from abortion disease. Immediately after the service seminal fluid was recovered from her uterus and injected into a number of guinea pigs, one of which subsequently showed abortion bacillus lesions. We still have this bull and are testing whether he will introduce abortion disease into a small herd of non-infected cows which is being carefully guarded against all other sources of infection.

A few years ago one of us, on the basis of our work on abortion disease, expressed the view that the abortion bacillus seemed to have a peculiar affinity for embryonic tissue. Today we are still inclined to this view, which brings with it the question whether the disease is not in fact primarily a disease of the embryo or fetus rather than of its mother. The mother, to be sure, is the source of infection, and possibly, if a large enough number of virulent abortion bacilli are poured into her body from her udder, antibodies of sufficient potency may develop in her blood to protect her fetus. Should this prove true, good results in the treatment of infected herds may be expected from injections, into the mother, possibly a short time before she conceives or early during pregnancy, of cultures of abortion bacilli, and it is possible in this case, that the more virulent the cultures are and the more abundant the material

injected, the better the results will be. But we must not wander off into hypothetical speculations.

For the time being, from our standpoint, the best we can do to prevent the further spread of abortion disease is to teach owners of uninfected cattle to have careful agglutination tests for abortion disease made of all cattle they propose to introduce into their herds, and owners of infected herds must be taught that aborted fetuses, and the afterbirths and discharges from the vaginas of infected cows, are infected with abortion bacilli and must therefore be disposed of with care. The treatment of individual cows which have aborted or failed to clean properly after parturition must be left largely to the good judgment of the practicing veterinarian, but we would like to make one suggestion regarding the douching of cows' uteruses. If the uterus is given a proper chance to heal after it has been damaged by an abortion or a retained afterbirth, the abortion bacilli in it need occasion little worry, as they will rapidly disappear of their own accord, and it is very questionable whether reparative processes are not retarded rather than facilitated by douching with germicidal solutions which are strong enough to kill bacteria in a reasonable length of time, or the length of time during which they may remain undiluted in the uterus.

Douching is no doubt good practice, but the object we should have in mind is a flooding out, a washing out, a real physical cleaning of the uterus, and this can best be done with solutions which are healing rather than germicidal, soothing and not irritating.

It is reported that the Veterinary Examining Board of Kentucky has already examined more than 250 applicants for licenses in that state and that another meeting of the board will be held at Frankfort early in December, in order that those who have passed the examinations may obtain licenses before January 1.

At the September meeting of the Northwest Iowa Veterinarians' Association at Sioux City, Dr. C. F. Nord, of Onawa, was elected president; Dr. Charles Parks, of Merville, vice-president; Dr. W. F. Hodam, of LeMars, secretary-treasurer. A clinic was held at the hospital of Dr. G. P. Statter.

The annual meeting of the B. C. Veterinary Association was held September 20, at Vancouver, B. C.

VACCINATION AGAINST INFECTIOUS ARTHRITIS OF FOALS DUE TO *B. ABORTUS EQUI**

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Enzootic, epizootic, or as at present more commonly termed infectious abortion has been recorded since the earliest time, but far more has been written regarding infectious abortion of cattle than concerning this disease in other animals. During the latter part of the nineteenth century, various foreign authorities and our own investigators noted severe outbreaks among the mares in different studs, in many cases spreading over and affecting a large percentage of the mares in certain localities. Most notable among these outbreaks in our country is that which occurred in the Mississippi Valley in 1866, the infection spreading and increasing in virulency to the extent that it caused enormous losses with a remarkably high percentage of abortions in some of the affected districts.

The horse-breeding areas in Illinois and adjoining states suffered the most, while in Kentucky in 1892, it is reported that seventy-five per cent. of the trotting and thoroughbred brood mares were either barren or had lost their foals. Bourbon County sustained a loss of over \$50,000, Fayette County even greater losses, and Madison and other counties experienced similar misfortune. The disease also inflicted much damage on the horse ranges in Montana in the same year.

The infection was first observed in South America in 1891 in the State of Buenos Ayres, Argentine Republic where the outbreak was described as the most destructive of any that had hitherto been observed in any part of the world and where the losses were incalculable.

At the time of these earliest outbreaks the cause was not known. Twenty-three years ago, or in 1893, following an outbreak of abortion among mares in a large stud in Pennsylvania, Kilbourn & Smith, (1) succeeded in the isolation, from one of the mares which had aborted, of an organism closely resembling the hog cholera bacillus and classified as such by Smith.

*Presented at the meeting of the A.V.M.A., Detroit Mich., Aug. 21-25, 1916.

The transmission experiments on pregnant mares and sows, although producing a catarrhal discharge from the vagina for a time, were not successful, the experimental animals dropping healthy offspring.

Turner (2) in 1894, with a bacterium isolated from the placenta and aborted fetus, succeeded in producing abortion in pregnant mares with inoculations of the cultures and the living foals showed typical joint affections.

In 1901, Ostertag (3) reported the isolation of a Gram negative streptococcus from the heart-blood, thoracic cavity and the intestinal tract of a fetus, but was successful in producing only a small percentage of abortions in artificially infected animals.

Numerous other investigators, including Lignieres and Zabala (4), Good (5, 6, 7, 8 and 9), Van Neelsbergen (10), de Jong (11), Dassonville and Riviere (12), Meyer and Boerner (13), and Schofield (14, 15), working over a period from 1897 to 1915, have all succeeded in isolating and have reported a bacillus belonging to the para-typhoid-enteritidis group and inoculation experiments on different animals were, with few exceptions, successful. The work of Good, and Meyer and Boerner, working independently in their bacteriological investigations was exceptionally thorough and added much to our knowledge concerning the biology of the organism, designated by them as *Bacillus abortivo-equinus* and *B. abortus equi*, respectively.

It was not the idea of the writer to report fully the work done by the different investigators in connection with equine abortion, nor do we have anything new to report regarding the biology of the organism. Our work in the outbreak heréin reported, established the causative agent as identical with the before-mentioned *B. abortus equi*. We desire, however, to report certain findings in connection with an outbreak of abortion in a stud containing a large number of thoroughbred mares, which was brought to our attention by reason of the fact that several mares had dropped premature dead foals.

Some of the other foals, which were carried to full time developed when from twenty to twenty-three days of age, typical cases of arthritis or joint evil, which did not yield to treatment by the veterinarian in charge, employing anti-streptococcic and anti-staphylococcic bacterins.

On January 27, and on February 4, 19, and 27, respectively, four mares in a brood stable containing thirty horses dropped dead fetuses; three of these were abortions which occurred between the ninth and tenth months, and the fourth was carried over eleven months. No report of these were received at the State Laboratory at the time and consequently we were unable to hold autopsies. Following the dropping of the fourth fetus at the ninth month, however, a very small piece of placenta was forwarded for examination and diagnosis. This was, of course, badly contaminated with numerous rapid-growing microorganisms and it required several platings before we were able to isolate and identify the *Bacillus abortus equi*. In the meantime other foals were beginning to develop joint affections and as we were reasonably certain that the abortions were of an infectious nature, blood samples were collected from fifty-four animals, including the thirty brood mares. Twenty-four of these were thoroughbred brood mares, twenty-two were light harness mares, five were stallions, and three were draft mares. Eight of the thoroughbred mares from the brood stable gave reactions to the complement-fixation test.

Table No. 1 shows results of serum tests on all the animals in the various stables, excepting ten yearlings which were in distant stables and from which blood was not collected for the first test. Serum in the amount of 0.2 and 0.1 ccm. only were used. The plus marks indicate complete fixation, and the minus marks indicate 25%, 50% or 75% hemolysis in the tube containing the amount indicated. The antigen used (0.25 ccm.) was a forty-eight hour bouillon culture of *B. abortus equi*, destroyed by heating in the water bath for on-half hour at 60 degrees C. and preserved by adding 0.5% carbolic acid. The hemolytic system was freshly titrated to the complement. The control tube carried on each horse and the positive and negative controls used to check the tests were all correct. The same numbers given these mares are carried throughout the test and correspond to the same horse when mentioned in other charts.

In order to arrive more definitely at some idea regarding the agglutination of *B. abortus equi* by normal horse serum, we carried out an agglutination test on a number of sera received for glanders diagnosis. These sera were collected in city stables and horses most unlikely to have been used for breeding or exposed to abortion infection for years. Results on over 100 of these tests

TABLE No. 1

Horse No.	Complement Fixation.	Agglutination 48 hours.	Diagnosis.	Horse No.	Complement Fixation	Agglutination 48 hours	Diagnosis.
1	N	N	N	38	0.1+	800—	Pos.
2	N	N	N	39	0.1+	500—	Pos.
3	N	N	N	40	0.2=	N	V. S.
8	N	N	N	41	0.1+	1-1000+	Pos.
15	N	N	N	42	N	500—	S
16	N	N	N	43	N	N	N
17	N	N	N	44	N	N	N
18	N	N	N	45	N	N	N
19	N	N	N	46	N	N	N
20	N	N	N	47	N	N	N
21	N	N	N	48	N	N	N
22	N	N	N	49	N	500—	S
23	N	N	N	50	N	500—	S
24	0.1+	1-1000+	Pos.	51	N	N	N
25	N	N	N	52	N	N	N
26	N	N	N	53	N	N	N
27	N	N	N	54	N	N	N
28	N	N	N	55	N	N	N
29	N	N	N	56	N	N	N
30	0.1+	500—	Pos.	57	N	N	N
31	N	N	N	58	N	N	N
32	N	500—	S	59	N	N	N
33	N	N	N	60	N	N	N
34	N	N	N	61	N	N	N
35	0.1+	800+	Pos.	62	N	N	N
36	N	N	N	63	N	N	N
37	0.2+0.1≡	N	Pos.	64	N	N	N

N.—Negative

Pos.—Positive.

S.—Suspicious.

V. S.—Very Suspicious.

emphasize the fact brought out by others workers along this line; namely, that normal horse sera but rarely gives an agglutination to *B. abortus equi* of over 1-300, the majority agglutinating less than 1-100.

Table No. 2 shows the results of the serum test on the mares in the brood stable, and it will be noted that of the eight reactors, four had dropped dead foals, two were barren, one of the mares, No. 35, (also a reactor) dropped a living foal which had a bad joint affection at the time of the test and the eighth, No. 30, had not foaled at the time of the test. In addition to showing the results of the serum tests on these mares, the table also gives other data

collected, including age, breed, year of first foal, and breeding results of the past two years of 1915 and 1916. It was in the stable holding these mares that all the reactors were found, here also it was that the foals developed the joint inflammation. Mares recorded as barren are those which failed to conceive after being repeatedly covered during the given year.

Of the thirty mares, ten failed to foal during the Spring of 1916, of these ten, seven were thoroughbreds, two were three-quarter bred Hackneys, and one a pony mare. Six of these thirty mares dropped healthy foals that have never shown joint affections

TABLE No. 2

No.	Foaled.	Class.	First Foal.	Due 1915.	Result 1915.	Due 1916.	Result 1916.	Lost Foals.	1st Compl. Fix. test.	Aggl. test 48 hours.
23	1903	T.	1904	5-16	5-16	Barren	Barren	1909 Twins	N.	N.
24	1903	T.	1909	3-25	3-28	3-29	2-29	Dead	0.1+	1000+
25	1898	T.	1911	2-25	3-7	2-23	3-19		N.	N.
26	1904	T.	1915	4-1	4-12	4-8	4-12		N.	N.
27	1906	L.H.	1914	Barren	Barren	3-29	4-4		N.	N.
28	1904	L.H.	1911	4-7	4-7	3-16	3-16		N.	N.
29	1906	T.	—	4-6	4-9	Barren	Barren		N.	N.
30	1909	T.	1909	4-30	4-6	3-15	3-15		0.1+	500—
31	1909	T.	1915	3-29	4-2	Barren	Barren	1915	N.	N.
32	1904	T.	1909	Not	bred	3-13	3-28		N.	500—
33	1912	T.	—	Not	bred	Barren	Barren		N.	N.
34	1895	T.	1906	Barren	Barren	3-22	3-17		N.	N.
35	1906	T.	1916	Barren	Barren	1-22	2-9		0.1+	800+
36	1905	T.	1911	3-28	3-28	2-2	2-12		N.	N.
37	1900	T.	1905	Not	bred	Barren	Barren		0.2+	
38	1905	T.	1909	Barren	Barren	1-17	2-4	1916	0.1≡	N.
39	1907	T.	—	—	—	3-14	1-22	1916	0.1+	800—
40	1912	T.	—	—	—	Barren	Barren		0.1+	500—
41	1907	T.	1916	—	—	5-1	2-27	1916	0.2 =	N.
42	1905	L.H.	1914	—	—	5-21	O.K.		0.1+	1000+
43	1900	L.H.	1908	—	—	4-7	O.K.		N.	500—
44	1899	T.	1906	Barren	Barren	3-23	O.K.		N.	N.
45	1912	L.H.	—	—	—	3-1	3-5		N.	N.
46	1903	L.H.	1908	—	—	3-13	O.K.		N.	N.
47	?	Pony	—	—	—	—	—		N.	N.
48	1909	L.H.	1913	—	—	—	—		N.	N.
49	1896	L.H.	?	?	—	?	?		N.	500—
50	?	L.H.	?	?	—	1-23	1-26		N.	500—
51	—	T.	—	—	—	Barren	Barren		N.	N.
52	—	T.	—	—	—	3-21	3-23		N.	N.

N Negative.

+ Complete Fixation or Agglutination.

— 25, 50, or 75% hemolysis or incomplete agglutination.

and of these six it is interesting to note that but one was a thoroughbred mare and foal. We may also mention here that the foal from this mare, No. 44, has not done so well nor attained the growth of other colts of the same age. Subsequent serum tests shown in Chart No. 3, show suspicious reactions in both mare and foal. As already mentioned, four mares, Nos. 24, 38, 39 and 41 dropped dead foals. The problem therefore was not as to what might be done for the reacting mares and their offsprings, but rather what was to be done for the other foals which had at this time or were later expected to become affected.

VACCINATION EXPERIMENTS. On March 23, we forwarded to the veterinarian in charge of this farm a vaccine. This vaccine was prepared from agar cultures of *B. abortus equi*, grown in the incubator for forty-eight hours at 37.5 degrees C. The cultures were washed off in normal saline solution and killed in the water bath for one hour at 60 degrees C., then shaken rapidly for thirty minutes in a bottle with glass beads to break up the growth. The thermal death point as determined by Meyer and Boerner was reported to be 60 degrees C. for eight minutes. To this killed vaccine was added 0.5 ccm. carbolic acid as a preservative. Sterility tests of the vaccine showed no growth in three days.

The approximate number of organisms per ccm. was estimated to be about eight million.

CASE No. 1.—(Thoroughbred). The first foal treated was from mare No. 30, which table No. 1 shows as having given a positive reaction to the serum tests. This foal was dropped on March 15th, and received on March 31st, April 1st and 2nd, 1 ccm. injections of the vaccine, subcutaneously. On April 3rd, 2 ccm., and on April 5th and April 6th, 3 ccm., a total of eleven cubic centimeters, or 88,000,000 killed organisms. This foal showed no local or systemic reactions following the injections; the temperature remained normal, varying from 102. to 102.8 and to date shows no indications of joint evil.

CASE No. 2.—Foal (thoroughbred) from mare No. 25, was dropped on March 19th, received on March 31st, April 1st and 2nd, respectively, 1 ccm. injections of the same vaccine subcutaneously. On April 3rd and 5th, two more injections of 2 ccm.—a total of 7 ccm. or approximately 56,000,000 killed organisms. As in case No. 1, this foal showed no severe local reactions, or systemic disturbances, and has not to date developed any joint inflammations.

CASE NO. 3. Foal (Thoroughbred) from mare No. 26, dropped April 12th, received when three days old 5 ccm. and when 5 days old 5 ccm. of the vaccine. Had no swelling at point of injection nor rise in temperature, nor has it developed joint affections.

CASE NO. 4. Foal (Thoroughbred) from mare No. 45, dropped March 5th, received on March 31st, April 1st and April 2nd, three injections of 1 ccm. each, and on April 3rd and 5th two injections of 2 ccm. each, subcutaneously. The foal to date has been absolutely O. K. in every way, and never showed local reactions to the vaccine.

CASE NO. 5. The foal from this mare, No. 50, a light harness mare, showed rheumatic symptoms in the front quarters and in the neck some days prior to the first injections on March 31st, April 1st and 2nd of 1 ccm., subcutaneously. On April 3rd and 5th two more injections of 2 ccm. each were given. In this case the injections were followed by local swellings, increased stiffness and accentuated rheumatic symptoms to such an extent that they were discontinued, but within ten days the colt was again all right, the stiffness having left the forelegs and neck and it has never shown further indications of joint affections.

CASE NO. 6: Thoroughbred foal from mare No. 32, dropped March 28th, received on March 31st, April 1st and 2nd—1 ccm. injections and on April 3rd and 5th, 2 ccm. injections. On May 12th, 45 days after the first injections, or double the period of incubation for foals showing affections before treatment, this colt developed symptoms of infectious arthritis, with swellings on the near stifle and immediately following in both hocks and on the near shoulder. Injections of 2 ccm. were again made on May 16th and 17th, with 3 ccm. injections on May 18th, 19th and 20th. All these injections caused severe local swellings. The colt was so stiff that only with difficulty could it get up to feed and it is hard to say that the vaccine increased the stiffness, although this appeared to be the case. For several days it was helped to its feet regularly for its milk; the swellings were not opened and began to subside within a week, with the result that it fully recovered and is today healthy and apparently none the worse for this severe attack.

CASE NO. 7.—Thoroughbred foal from mare No. 36, a non-reactor stabled between two positive reactors. This colt was foaled on February 12th and 21 days later developed hot, painful inflam-

matory swellings of both hocks, the right stifle, left shoulder, forearm and knee. After developing the first symptoms and before our vaccine was prepared the veterinarian gave this foal two injections of anti-streptococcic vaccine and reports that the colt continued to grow worse and appeared to have but little chance for recovery. On March 24th he received the vaccine prepared and gave an injection of 1 ccm., continuing injections of this amount daily to and including April 2nd, getting severe local swellings at the point of injection and increased stiffness in the legs; but as the colt seemed brighter and had a good appetite they were not discontinued. After injections of 2 ccm. on April 3rd and 5th, the injections were stopped, the colt having received 14 ccm., or approximately 112,000,000 killed organisms. The veterinarian's report of April 15th showed much improvement, the swelling leaving the hock and stifle, temperature and appetite normal, and it continued to improve until by July 1st he was in good shape. Today the joints show no increased thickness or swellings whatever.

CASE No. 8.—Thoroughbred foal from mare No. 35, dropped Feb. 9th, developed twenty-one days later, joint affections in the hock, stifle and one knee, and later a diarrhea. It received two injections of anti-streptococcic vaccine, but continued to grow worse, and on March 24th, 25th, 26th and 27th, after having been sick for over three weeks, received four 1 ccm. injections of *B. abortus equi* vaccine subcutaneously. These injections caused severe local reactions and on March 24th the swelling on one stifle broke and discharged a thin, flaky exudate. This foal died on the night of March 27th. Owing to a misunderstanding we did not receive the carcass until the evening of March 28th, 24 hours after death, and the autopsy consequently showed decomposition changes. Notes taken at the autopsy table were as follows:

Carcass emaciated; anus, tail and hind quarters stained with feces. Both hock joints swollen, the left one greatly enlarged; over the right hip a discharging abscess; slight rigor mortis present; blood coagulated and showing traces of hemolysis due to decomposition. Both body cavities free from fluid.

Heart: Myocardium presented a cooked appearance, auricles and ventricles filled with blood. Lungs: hypostatic congestion, slight edema, no petechiae. Liver: Congestion of blood vessels, cloudy swelling, parenchymatous degeneration, capsule stripped easily, friable, decomposition. Spleen: Capsule wrinkled, trabe-

culae prominent, pulp soft, decomposition changes. Intestines: presented a greenish discoloration throughout, catarrhal enteritis, yellowish semi-liquid content with considerable mucus. Mesenteric and body lymph glands greatly swollen, soft and edematous. Kidneys: Soft, friable, parenchymatous degeneration. In the abdominal cavity, directly over the xyphoid cartilage, an abscess about two inches in diameter, contained a yellow, creamy pus.

Cultures were taken on plain and glycerine agar and in bouillon from the heart-blood, axillary arteries, spleen, liver, kidney, lungs, intestines, hock-joints, coxo-femoral articulation, hip abscess, and supra-sternal abscess. Pure cultures of *B. abortus equi* were obtained from the spleen, liver, kidney, hock-joints, coxo-femoral, articulation, and supra-sternal abscess. The organism was also present from the heart-blood, axillary arteries and lungs, but was contaminated with other organisms and had to be replated before it was obtained in pure cultures.

CASE NO. 9.—Thoroughbred from mare No. 34, dropped March 17th, developed when 23 days old swellings of the hock and knee joint. On March 31st, April 1st and 2nd received 1 ccm. injections of vaccine. On April 3rd, 5th and 30th, it received injections of 2, 2, and 4 ccm. of the vaccine, respectively. From the very first injection on March 31st, or nine days before the joint swelling appeared, this colt showed local swellings at the point of inoculation, stiffness of the neck and all joints.

This stiffness continued to such a marked degree that the veterinarian in charge discontinued the vaccine after the fifth injection, and although the stiffness disappeared, joint swelling appeared and increased until the right hock was about the size of a man's head. In the meantime the colt developed a prolapse of the rectum and a bad diarrhea which was hard to control, and died on May 10th, receiving during this time but one further injection, 4 ccm. on April 30th.

AUTOPSY NOTES:—Carcass emaciated, right hock greatly enlarged, when opened showed pus sac containing chocolate-tinted fluid with honeycombed tissues. Interior of joint filled with chocolate-tinted fluid, synovial membrane highly congested. Large amount of connective tissue around the epiphyses of bones; yellowish, gelatinous infiltration along tendon sheaths to stifle joint. Right stifle joint shows abscess cavity just anterior to joint and holding about one pint of chocolate-colored fluid with flakes of

fibrin, some fluid within joint, cartilage of condyle excoriated and chain of abscesses along muscle which attaches to internal tuberosity contained creamy pus. Left carpal joint; synovial membrane congested and fluid increased in amount, mass of connective tissue around joint with fistula leading into lower end of ulna, bone honey-combed and purulent. Third rib enlarged at cartilage, and on cross section swelling is soft and filled with creamy pus. Lungs: Small petechiae well distributed, anterior parts of both principal lobes pneumonic, show on section abscesses well encapsulated and size of pea. Heart: Vessels congested, myocardium pale and friable, no petechia. Liver: Congested, dark in color and very friable. Spleen: Size $5\frac{1}{2}$ " by 10", capsule speckled with petechiae. Kidneys: Capsule attached, friable. Intestines: Catarrhal enteritis, mesenteric lymph glands swollen, soft and edematous.

Numerous cultures from the various organs and joints enabled us to isolate easily *B. abortus. equi*.

CASE NO. 10.—Foal (Thoroughbred) from mare No. 52, foaled March 23rd. On March 31st, April 1st, 2nd and 3rd, received 1-, 1-, 1- and 2-ccm. injections, subcutaneously, and showed severe local reactions.

Thinking to use this as another control on the vaccine in small amounts, the injections were discontinued and when forty days old the veterinarian reports a development of well-defined swellings of one knee and hock and within two or three days a bad diarrhea.

The foal grew gradually worse, developed another swelling on the right shoulder which was hot and painful, both stifles were swollen and on the inside of the left thigh a cold abscess developed and was opened. The discharge was thin, blood-stained, slightly flaky fluid in large amounts. The right front leg and shoulder continued swollen and very painful and on May 31st the foal died.

AUTOPSY NOTES.—Both hocks, stifles, knees and elbow joints were swollen, the right shoulder was enlarged, synovial membrane, highly congested, joints filled with chocolate colored, reddish brown fluid. The tendons and muscles at points of attachment were thickened, the muscles were degenerated and the bones, especially at joints, were soft and readily cut with a knife. Straw-colored gelatinous edema in the subcutis over the elbow of the right shoulder and half way up the neck. The right knee slightly enlarged, synovial fluid greatly increased and thickened. Synovial membrane highly congested. The left elbow was enlarged, synovial fluid of

reddish brown content, edema between muscles extended up the shoulder and part way down the knee. The left knee was apparently normal, with the exception of a deep redness of the synovial membrane. Both hocks were enlarged with connective tissue formation surrounding the tendon attachments. Muscles of cooked appearance, lymphatics greatly enlarged, edematous and in places purulent; reddish fluid in excess in both hocks, synovial membrane thickened and reddened. Both hips affected, the left to a greater extent than the right, with pus cavity size of an egg, just anterior to joint and between the musculature. Pus of creamy, yellowish color. The lymph glands throughout the whole body were greatly enlarged, edematous, in the majority of cases filled with purulent material; the most notable of these enlarged glands were the precural which were the size of an egg, the sub-lumbar the size of a walnut, and the mesenteric, the most pronounced of all, resembling a mass of tumors throughout, the size of walnuts. Heart: Cooked appearance of muscles, very friable, few pericardial hemorrhages. Lungs: Passive congestion. Liver: Enlarged, friable, rich in blood, light patches on right lobe resembling fatty degeneration. Spleen: Swollen, congested, trabeculae prominent, pulp protruding, capsule studded with few petechial hemorrhages. Kidneys: Friable, capsule adherent, alternating red and yellow streaks throughout the medulla. Intestines highly congested, catarrhal and hemorrhagic in places, small hemorrhagic suffusions over the surface of the mucous membrane of large colon.

OTHER INVESTIGATIONS. Unfortunately, the laboratory force was exceptionally busy on a large amount of necessary routine work during the months that this experiment was conducted and we were unable to follow many details as we had hoped to do. For example, serum tests on all the affected colts, which should have been made at regular and frequent intervals, to show the appearance and duration of immune bodies produced, were not carried out.

On April 6, the agglutination and complement fixation tests were applied to the serum of foals from mares Nos. 36, 44, 45, and 50. Both foals from mares Nos. 36 and 50 were infected at the time and gave complete fixation of complement with 0.1 ccm. of serum. No. 44's foal, given special mention earlier in this article, showed no reaction to the complement fixation test, and No. 45's foal, showed no fixation to the complement after three injections of 1 ccm. of the vaccine, which, of course, was to be expected. None of

these foals agglutinated at a dilution of 1-500, which was the lowest dilution run in the test.

Bacteriological examination of cultures from vagina of mares Nos. 24, 30, 35, 37, 38, 39, 40 and 41, failed to show in any instance *B. abortus equi*. Only two of these mares, Nos. 39 and 41, were showing traces of the typical chocolate-colored discharge which had existed.

Milk specimens were collected on March 30th from mares Nos. 35 and 36, both of which had badly affected foals. The bacteriological examinations of this milk were negative to the specific organisms.

Sera from three mares, Nos. 24, 38 and 39, were included in a test of sera from a dairy stable, suspected of harboring *B. abortus* Bang, and in all the instances were entirely negative to this antigen.

Thinking to possibly trace the source of this infection, and also determine whether or not outside mares might have been infected on the farm, the owner wrote to various breeders who had shipped mares to him within the past year for service and asked to have blood specimens submitted to us. Twenty-five different sera from mares and stallions were collected in this manner and all gave entirely negative reactions when subjected to the serum tests.

On August 3rd, the ophthalmic test was applied to all animals on the place and at the same time blood was drawn for serum retests. The "abortin" was made from a bouillon culture of *B. abortus equi*, grown for several weeks in the incubator at 37.5 degrees C. After killing by heat it was concentrated to one-tenth of its volume and the concentrate precipitated by adding twenty parts of absolute alcohol. The precipitate was removed from the filter paper, dried in a desiccator on porcelain plates, ground to a fine powder and when used made into a five per cent. solution with normal saline solution.

Table No. 3 shows the results of the serum tests and ophthalmic reactions. Comparison of the first and second serum tests demonstrates the fact that the anti-bodies produced by *B. abortus equi* are not as stable as those found in cattle infected with *B. abortus* Bang, or those found in horses infected with glanders, approximately five months only having elapsed since the first test.

The work done on this, the second outbreak of infectious abortion in mares in Pennsylvania brought to our attention since 1913, we regard as pointing to the following conclusions:

TABLE No. 3
OPHTHALMIC REACTIONS

No. Hor.	1st C. F.	1st Agg.	2nd C. F.	2nd Agg.	4 hr.	6 hr.	9 hr.	Phy. Con.
8	N	N	N	N	N	N	N	X
15	N	N	N	N	N	N	N	X
16	N	N	N	N	N	N	N	X
19	N	N	N	N	N	C	N	X
20	N	N	N	N	N	N	N	X
23	N	N	N	N	L	S	N	X
24	0.1+	1-1000+	0.1+	400—	N	N	N	X
25	N	N	N	N	N	N	N	X
26	N	N	N	N	N	N	N	X
27	N	N	N	N	N	N	N	X
28	N	N	N	N	N	N	N	X
29	N	N	N	N	N	N	N	X
30	0.1+	500—	N	N	N	N	N	X
32	N	500—	N	N	N	P	P	X
33	N	N	N	N	N	N	N	X
34	N	N	N	N	N	N	N	X
35	0.1+	800+	0.2—	N	N	N	N	X
36	N	N	N	N	N	N	N	X
37	0.2+, 0.1=	N	N	N	N	N	N	X
38	0.1+	800—	N	N	N	N	C	X
39	0.2=	500—	0.1+	N	N	N	N	X
40	0.1+	N	N	N	N	N	SC	X
41	0.1+	1-1000+	0.1+	N	N	N	N	X
42	N	500—	N	N	N	N	N	X
43	N	N	N	N	N	N	N	X
44	N	N	0.2—, 0.1=	N	N	N	N	X
45	N	N	0.2=	N	N	N	N	X
46	N	N	N	N	N	N	N	X
47	N	N	N	N	N	N	N	X
48	N	N	N	N	N	N	N	X
49	N	500—	N	N	N	N	N	X
Eyes gummy and suspicious								
50	N	500—	N	N	C	C	C	X
57	N	N	N	N	N	N	N	X
58	N	N	N	N	N	N	N	X
59	N	N	N	N	N	N	N	X
60	N	N	N	N	N	N	N	X
61	N	N	N	N	N	N	N	X
62	N	N	N	N	N	N	N	X
63	N	N	N	N	N	N	N	X
64	N	N	N	N	N	N	N	X
65	(65 to 70 yearlings	N	N	N	N	N	N	X
66	not in first test)	0.1+	N	N	N	N	N	X
67		N	N	N	N	N	N	X
68		N	N	N	N	N	N	X
69		0.2+, 0.1=	N	N	N	C	N	X
70		N	N	N	N	N	N	X
71	(See Case No. 7)	0.2—, 0.1=	N	N	N	N	C. & P.	X
72	(See Case No. 6)	S. R.	N	S	P	N		XXX
73	(See Case No. 1)	0.1+	N	N	N	N	N	X
74	(See Case No. 2)	0.1+	N	N	N	N	N	X
75	(See Case No. 3)	N	N	N	N	N	N	X
76	(See Case No. 5)	0.2—, 0.1=	N	N	N	N	N	X
77	(See Case No. 4)	0.2—	N	N	N	N	N	X

"N"—Negative

"C"—Conjunctivitis

"P"—Pus, small amount

"S"—Suspicious

"X"—Good condition

"XX"—Fair condition

"XXX"—Poor condition

CONCLUSIONS. (1) The outbreak was due to an infection with the same organism belonging to a sub-group of the para-typhoid enteritidis group, which has caused numerous outbreaks of abortion in mares in both United States and Canada, and which has been isolated by various authorities here and abroad.

(2) The complement-fixation and agglutination tests are reliable for determining the extent of the infection in the stable, but the best results can be obtained by repeating these tests at intervals of three to four weeks. Animals giving an agglutination reaction of 1-500 or over, with no complement-fixation reaction, should be watched and retested in three weeks. Immune bodies in some cases disappear rapidly.

(3) One ophthalmic test with the purified "abortin" is of no value in determining the infected animals. Whether or not a different preparation of abortin or a retest, after the eye has been sensitized with one dropping, would give better results, has to be determined.

(4) The fact that all of the colts, either infected or later developing affections of the joints, gave marked local reactions to the bacterin may indicate such a preparation to be of diagnostic value when injected or rather vaccinating foals against joint evil, which do not at the time give serum reactions.

(5) Vaccination of exposed foals with a specific bacterin appears to confer some immunity to the disease, and may also have some curative properties, as seven out of ten foals, either thoroughly exposed to the infection, or badly infected, failed to develop or completely recovered from a severe attack of infectious arthritis. Owing to the fact that we were unable to try the vaccine on a large number of animals experimentally, we hesitate to base our conclusions too strongly on results obtained, and they should be confirmed.

(6) It appears to us that two or three injections of 50,000,000 to 100,000,000 organisms, followed by more if necessary, would be much better than numerous injections of small amounts as given by us, and we also feel that if we had given continuous injections of this bacterin to two of the three foals mentioned in the following paragraph, both would have been saved.

(7) Of the three foals not saved, foal No. 35, had been sick for over three weeks and died after the fourth injection; another, No. 34, received only 88,000,000 organisms and the condition was aggravated by a profuse diarrhea and prolapse of the rectum,

while the third, No. 52, received but 40,000,000 bacteria and did not develop articular swellings until seven weeks old. The other foals (except No. 34, 40 days) developed in from 20 to 23 days of age.

(8) Thoroughbred mares and foals in this outbreak appear to be much more susceptible than the Hackney and draft mares and foals exposed, although we recognize the fact that another season may show the infection in these also.

(9) Information received regarding the aborting mares in the stud reported by Meyer and Boernér in 1913, shows that the following year all dropped healthy foals, while another mare purchased and added to the stable aborted in 1914. This would indicate an acquired immunity in aborting mares, also that one or more of them continued to spread the infection.

In the outbreak herein reported the source of infection could not be determined, nor did the records point to any one stallion on the farm as having carried or spread the infection. As the colts were born, the navel was carefully treated and tied. There seems to be little doubt that the infection of the foals may occur *in utero*, and we are also inclined to believe there is a strong possibility of a feeding infection, due to the stable becoming contaminated with the infective discharges.

I herewith wish to acknowledge my appreciation and thanks to the owner of this stable, through whose courtesy and assistance we were allowed to carry out this work, and to Drs. Bartholomew, Stubbs and Boerner, who worked in assisting with the tests and supplying information and records which have proven invaluable.

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DISCUSSION

DR. GILTNER: I would like to ask Dr. Hardenbergh if he has done anything in connection with vaccines in the way of preventing abortion in mares?

DR. HARDENBERGH: We have not had any opportunity of trying out these vaccines on mares in order to prevent abortion. I believe that Dr. Ostenberg tried these experiments and was not very successful and that Dr. King of Kentucky made a serum which he tried, but which did not prevent abortion.

EXPLANATION OF CUTS

- No. 1. Foal and mare No. 36, non-reactor, stabled between two reactors. Developed joint evil when twenty-one days old. Note swollen hocks. (See Case No. 7).
- No. 2. Same as No. 1. Showing swelling and edema of shoulder and forearm.
- No. 3. Foal and mare No. 52. Swelling of left shoulder, stifle and hock. Left forefoot drawn off ground at heel. (See Case No. 10).
- No. 4. Same. Showing hock swellings.
- No. 5. Foal and mare No. 34, showing joint inflammation. Received small amount of vaccine. Swelling developed at forty days. (See Case No. 9).
- No. 6. Same foal showing great joint swellings.



FIG. 1.
FIG. 2.



FIG. 3.

FIG. 4.



FIG. 5.
FIG. 6

WHAT CAN BE DONE TO IMPROVE THE MILK SUPPLY IN PENNSYLVANIA?*

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My acceptance of the invitation of your president to present a paper on "What Can Be Done to Improve the Milk Supply in Pennsylvania?" is not to be construed as an indication that I think I possess the only solution to this problem but rather as evidence of a willingness to enter into a discussion of the subject in the hope of bringing out useful facts and helpful suggestions.

It is encouraging to know that those who are familiar with the conditions previously existing on dairy farms and in distributors' plants in Pennsylvania are of the opinion that in general there has been a considerable improvement in the methods of producing and distributing milk in the last 10 or 15 years. Stables and cows are more generally cleaned, herds containing clinically tuberculous cows are less common, more attention is given to cleanliness in milking and to cooling the milk, distributors are better equipped to care for and deliver milk, there are fewer arrests for skimming, watering or the addition of preservatives, and samples of milk collected in cities and towns test better as a rule in regard to the number of bacteria and the presence of pus cells and streptococci. All this is very encouraging, but there is still need for further improvement. During the years 1911, 1912 and 1913, about one-fifth of the 190,000 dairy farms in Pennsylvania were visited by agents of the State Livestock Sanitary Board, who made an examination of the cattle for health and cleanliness and inspected the sanitary conditions of the premises and the methods of producing and caring for the milk. (No inspections could be made in 1914 and 1915 because the resources of the Board were taxed to the limit by the prevalence of foot-and-mouth disease [aphthous fever]). The farms inspected were classified, according to the conditions found, into four groups: "excellent," "good," "fair," "bad." A few farms were classed as "excellent," from 30 to 40 per cent. were classed as "good," 50 to 58 per cent. were scored "fair" and 8 to 15 per cent. fell into the "bad" group. On the dairy farms classed

*Read before the Pennsylvania State Medical Society at Scranton, Pa., Sept. 21, 1916.

"excellent" or "good," the conditions were favorable to the production of milk of good hygienic quality; on those classed as "bad" the conditions were quite the opposite, while the farms classed as "fair" stood on the border line between these two classes. Although these figures cover only a small portion of the dairy farms of the state, they can probably be accepted as representative of the conditions in general throughout Pennsylvania because the farms inspected were located in all parts of the state.

"What Can Be Done to Improve the Milk Supply in Pennsylvania?" is therefore a very pertinent question. Three groups of individuals are involved in this question, namely: (1) the producers and distributors, (2) the public health officials, and (3) the consumers. What is the attitude of these different groups toward the proposition under discussion?

Producers who are really dairymen, i. e., those whose chief business is the production of milk, have changed their attitude toward dairy inspection in recent years. They have discovered that many of the methods recommended for sanitary reasons are also good economically. Brushing the cows, wiping the udder, removing the manure from the stable, light and ventilation in the stable, sterilizing the milk vessels, and cooling the milk are all now regarded as good dairy practices, and are taught in the dairy schools, because experience has demonstrated that they increase production, help to maintain the cattle in health, facilitate the work, and avoid losses and complaint on account of spoiled milk. These discoveries have overcome to a considerable extent the prejudice and suspicion which formerly existed in regard to dairy inspection, but there are other conditions which do not meet with the approval of dairymen. The most important of these are duplication of inspections by different municipalities or by different departments of the state government, multiplicity of regulations, untrained inspectors, frequent changes in regulations involving alterations in buildings or equipment, requirements in regard to buildings or equipment which are expensive and not absolutely essential, careless or ill-founded statements regarding the effect of milk on the health of the consumer, and the drawing of regulations by men who have no practical knowledge of the dairy business. Finally, the dairyman considers it an injustice that he should be required to adopt methods which involve additional work or added cost for labor or material without a corresponding increase in the selling price of his

product. He points out that while sanitary requirements have in recent years increased his cost of production, everything he buys has also advanced in price. Statistics compiled by disinterested men show that this is true. In the last 5 years, the cost of farm labor in Pennsylvania has advanced 12 to 17.5 per cent., and the price of milk cows has increased 38 to 52 per cent. By-products like cotton seed meal, dried brewers' grains, dried beet pulp and malt sprouts, which are used for feed, are from 20 to 40 per cent higher today than 10 years ago and the prices of other feeds have advanced from 10 to 15 per cent. The market value of home grown feeds has also increased very much. Clover hay has shown an advance of 58 per cent. since 1906. Within the last 8 years the freight rates on milk shipped into Philadelphia, which the dairyman usually pays, have increased 50 per cent. in general and in some instances 77 per cent. And during this same period the price which a dairyman receives for his product has remained stationary or advanced very slightly.

The position of the distributor is similar to that of the producer. Sanitary regulations requiring the bottling of milk, pasteurization, etc., have added to his expenses, while wages and the cost of horses, feed, wagons, etc., have also increased, but in most cities and towns the retail price of milk has remained the same.

The economic conditions affecting the production of milk have driven many general farmers, with whom dairying was a side line, out of the business. At the same time, an undesirable foreign element has taken up dairying in the neighborhood of some of the large cities. These people are able to produce cheap milk at a profit because they occupy a small piece of land with very cheap and inadequate buildings in districts where they can graze their cows on vacant lots; in some cases they feed their cows on various kinds of refuse, and they usually have large families, all of whom work in the dairy. Their standard of living is low and they have little or no conception of cleanliness.

The attitude of local health officials toward the milk supply of their own town is very variable, ranging all the way from total indifference to over-zealousness. The attitude may also change very suddenly. A local health board which has for years entirely ignored the conditions of the milk supply will sometimes be stirred up by some unpleasant occurrence and will then adopt the most stringent regulations for the guidance of dairymen and expect con-

ditions to be changed at once from the undesirable to the ideal. Sometimes, elaborate regulations are promulgated without any means of enforcing them. In such cases, the dairymen who obey them are likely to think that the men who ignore them are being favored by the health officials. The consumer is also given a false sense of security. Regulations are sometimes adopted requiring expensive alterations or equipment which are not absolutely essential to the production of wholesome milk. Very few local health boards seem able to employ properly qualified men as dairy inspectors. Dairymen very naturally resent being advised in regard to their business by one who knows little or nothing about it. Local health officials do not always show sympathy for the difficulties of the dairyman. This is not due to any disposition to be inconsiderate but rather to an inability to appreciate the technical and economic problems with which the dairymen have to contend. Perhaps the principal cause of the errors of local health boards is the absence from the membership of any one with a practical knowledge of the dairy business.

Consumers in general seem to be less interested in the condition of the milk supply than the individuals in the other two groups concerned. Many consumers do not recognize hygienic quality in milk. They seem to be interested only in the price and the amount of cream. If these are satisfactory and the milk holds together until it is used, they are usually contented. People who buy the best grades of other articles do not usually buy the best grade of milk. Comparatively few wealthy people buy certified milk. A Philadelphia milk dealer states that he has been told by well-to-do physicians and other people in comfortable circumstances that they would not pay the price of certified milk. The bulk of this grade of milk is sold to people who purchase it for their children on a physician's order and they usually buy it only as long as this special need exists. This general indifference of consumers in regard to the hygienic properties of milk has made it possible for the careless or ignorant producer with unsuitable equipment to compete with the careful dairyman who is trying to produce a high grade of milk. Consumers are being slowly but steadily educated, however, in regard to the hygienic properties of milk and the demand for a safe milk supply is gradually growing. The ability of the general public to distinguish between good and bad milk is limited. Milk which spoils or which has an abnormal taste or odor can be read-

ily recognized but milk may be possessed of some very undesirable properties and still have the appearance and taste of good milk. The consumer alone cannot always distinguish between good and bad milk or between milk of good or poor hygienic properties. His city or state government must do this for him, or help him to do it himself. Some of the indifference of milk consumers to the hygienic properties of milk may be only apparent and may be due to this fact.

These are the conditions as they exist today. How can they be improved?

One of the requirements indicated by the present conditions is a single uniform system of inspection, directed and carried out by men who are qualified by training and experience for the work. This would avoid duplication of inspections and multiplicity of regulations and would also provide the means for efficient but reasonable regulations. At the same time, it would prevent a producer whose milk is shut out of one municipality from sending it to another; it would provide small as well as large communities with competent inspectors, and would overcome many other defects of the present system.

A uniform inspection system could be most readily established by placing the work in charge of one of the departments of the state government. The department which appears to most fully meet the requirements of the situation is the State Livestock Sanitary Board. This Board consists of the Governor, the Secretary of Agriculture, the Dairy and Food Commissioner and the State Veterinarian. All of the groups of individuals concerned in the problem of a good milk supply are represented in its membership except the public health officials, but the work of inspecting the dairies would necessarily have to be taken up in consultation with the local health officials of the municipality in which the milk is sold, so that this group would also be represented.

Another requirement which seems to be indicated is the grading or classification of milk, i. e., certain well-defined grades should be established by state authority, based on the conditions existing on the dairy farm and the bacterial count, and all milk offered for sale should be labeled according to this classification. At the present time in Pennsylvania there is no official definition of the names under which milk may be sold except in Philadelphia and even in that city the indiscriminate use of terms like "baby's milk," "nursery milk," etc., is not prohibited.

Under the present conditions, outside of Philadelphia, milk produced under good sanitary conditions is sent to a distributor who also receives milk produced under objectionable conditions and the two kinds of milk are mixed before delivery to the consumer. The entire milk supply is reduced in hygienic quality to the level of the lowest. There is no incentive for a dairyman to produce good milk under these conditions.

The grading of milk, if properly carried out, is just and equitable to all parties concerned. The product of the careful, conscientious dairyman will be graded higher and can be sold for a higher price than the milk produced by the careless and indifferent man. Milk consumers will be able to distinguish between good and bad milk; those who desire good milk and those who are satisfied with milk of a low grade at a low price will find it convenient to purchase the kind of milk they prefer. The distributors who deal in a high grade of milk and those who deal in a low grade will be classified accordingly. Milk will be sold according to quality, like other commodities.

Grading milk is not an untried proposition, but has been in operation for several years. In New York City, where the system has been in use since 1912, the results have been entirely satisfactory. It has stimulated dealers and consumers to put forth greater efforts to produce a high grade of milk and has improved the general character of the city's milk supply. A law which went into effect in November 1914 requires that all milk sold in the state of New York shall be labeled according to certain specified grades. This law has brought about a very marked improvement in the milk supplies of the various communities of the state, especially in cities having a population of over 10,000. Milk has been graded in Philadelphia since 1914 and has brought about a general improvement in the milk supply of the city. Under the Board of Health of Radnor Township, Delaware County, the grading of milk has improved the dairies in that district, bringing about improvements which placed dairies formerly scored "poor" in the "fair" and "good" classes.

In some of these places, the producers and distributors were at first hostile to the grading of milk but after they became acquainted with the operation of the system they regarded it with favor. There was also some difficulty in regard to labeling the different grades of milk until the distributors became familiar with the regu-

lations and had an opportunity to arrange to comply with them. At the present time, everybody concerned seems entirely satisfied, although in some localities consumers are indifferent.

It is not possible, within the time allowed for this paper, to enter into detail regarding the specifications of the different grades of milk. In conclusion, therefore, in answer to the question, "What Can Be Done to Improve the Milk Supply of Pennsylvania?" I would say establish a uniform system of inspection under state control and require milk to be graded and sold according to an officially defined classification.

A SYNOPTICAL KEY TO THE ADULT TAENIOID CESTODES OF THE DOG, CAT, AND SOME RELATED CARNIVORES

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It is believed that this key will be of value to students who have occasion to make identifications in this group, perhaps the most economically important group of tapeworms known, more important even than the strobilate tapeworms of man. While there have been some excellent studies dealing with one or a few of the dog tapeworms, notably that of Deffke (1891), it is nevertheless difficult to identify, with any certainty, the various tapeworms of the dog without consulting a number of papers. Matters are naturally even worse as regards the parasites of wild carnivores, although these are also of considerable importance, since the dog tapeworms may be found in wild carnivores, and tapeworms of wild carnivores may be found in the dog, as in the case of *Taenia balaniceps*, which was reported by Hall (1910) from the dog from the lynx.

SYNOPTICAL KEY

The tapeworms of the dog, cat and some related carnivores may be separated into groups and identified by the use of the appended key, which is intended to designate the relations and im-

†Resigned September 19.

portance of the tapeworms as well as to distinguish them from one another. The key does not cover the species in the family Diphylobothriidae.

1. Head provided with two slit-like suckers, and segments with a rosette-shaped uterus having a special aperture in the midventral line for the discharge of eggs. Larvae in fish. Rare in the United States and of little economic importance here *Diphylobothriidae*
 Head with four cup-shaped suckers.....2
2. Follicular yolk glands in the lateral fields. Accidental parasites reported from the dog only once *Ophiotaenia punica*.
 Yolk glands in median field, never in lateral fields.....3
3. Genital pore located on the ventral surface near the median line. Eggs in gravid segments contained in a single thick-shelled egg capsule. Life history unknown. Rare in the United States and of little economic importance *Mesocestoides lineatus*, *Mesocestoides litteratus* (probably identical species).
 Genital pore lateral. Eggs in gravid segments contained in a uterus or in numerous egg capsules.....4
4. Usually large forms. Genital pores irregularly alternate. Rostellum usually well developed and usually armed with a double crown of hooks, rarely with a single (?) crown of hooks or unarmed. Suckers unarmed. Uterus with a median stem and lateral branches. Eggs thick shelled. *Taeniidae*. 5.
 Usually small forms. Genital pores single or double; if single, regularly or irregularly alternate. Rostellum present or absent; if present, armed with one to numerous rows of hooks. Suckers armed or unarmed. Uterus sac-like and persistent, or a single or double uterus with one or several parauterine organs to which the eggs pass in the final stage of development. Eggs with thin transparent shells..... *Hymenolepididae*. 19.
5. Strobila less than 1 cm. long and composed of a head and 3 segments, only one of the segments being gravid at a time. Lateral uterine branches often quite indistinct. Yolk-gland globular. Larval stage an echinococcus with thick laminated wall, and developing brood capsules containing the larval scolices. Of considerable medical and economic importance *Echinococcus granulosus*.
 Strobila at least several centimeters long and composed of a head and numerous segments, from 10 to hundreds, with a number of segments usually gravid at one time. Lateral uterine branches usually distinct, at least in early stages of formation. Yolk gland posterior of ovaries and elongate or triangular, with one side parallel to the posterior margin of the segment. Larval stage a bladderworm with thin walls and never containing brood capsules6
6. Strobila without a neck and with a double circle of many and very large hooks, the large hook over 300 μ long, or with only a single circle of hooks (?). Bladderworms, so far as known, with a small caudal bladder and with a long segmented structure connecting the bladder and

- head. Parasitic in Felidae7
- Strobila with a neck and with a double circle of hooks, the large hook less than 300 μ long. Bladderworms with a caudal bladder, a head and a moderate sized neck. Parasitic in Canidae10
7. Rostellum with a single circle of hooks of rose-thorn shape. Reported from *Lynx lynx* (*Felis lynx*) *Taenia monostephanos*
- Rostellum with a double circle of hooks, the large hooks over 300 μ long. 8
8. Large hooks 60 to 75 in number; 320 to 355 μ long; the large hooks arranged so as to form in effect 2 circle of large hooks, being alternately nearer to the center of the rostellum and farther from it....
- *Taenia macrocystis*.9
- Large hooks not over 60 in number9
9. Hooks 26 to 52 in number. Well developed sphincter vaginae.....
- *Taenia taeniaeformis*
- Hooks 38 to 60 in number. Probably identical with the preceding species. *Taenia laticollis*
10. Vagina with a reflexed curve near the lateral excretory canals. Large hooks 135 to 180 μ long and usually with a sinuous handle.....
- *Multiceps* spp. 11.
- Vagina without a reflexed curve near the lateral canals....*Taenia* spp. 13.
11. Mature segments wider than long; the lateral margins of each segment often scalloped as a result of a number of constrictions or furrows passing around the segment transversely; the posterior margin of each segment prolonged posteriorly to overlap the anterior margin of the succeeding segment like a cuff. Small hook with short, blunt curving handle. Genital papilla very narrowly conical and in posterior half of segment, often near posterior margin. Larva a coenurus with daughter bladders, found in the connective tissue of rodents (including the Lagomorpha) *Multiceps serialis*
- Mature segments longer than broad; the lateral margins of each segment smooth and not scalloped; the posterior margin of each segment prolonged very little or not at all to form a projection over the following segment. Small hooks with long slender handle. Genital papilla posterior of middle of segment but never near posterior margin. Larva a coenurus without daughter bladders found in ungulates, especially ruminants12
12. Small hooks with long curving handle terminating in a blunt distal extremity. Large hook with tapering handle with sinuous outline. Testes do not extend posterior of the ovaries to the vicinity of the vitellarium or between the vitellarium and the ovaries. Larva a coenurus in the central nervous system of ungulates, especially ruminants, and of considerable economic and medical interest.....*Multiceps multiceps*
- Small hook with long straight handle terminating in a blunt distal extremity. Large hook with the handle not tapering, and either straight and blunt or bent dorsally just at the tip. Testes extend posterior of the ovaries almost to the vitellarium and between the vitellarium and the ovaries. Larva a coenurus in the central nervous system, paren-

- chymatous organs and connective tissue of ruminants
 *Multiceps gaigeri*.
13. Forms in which the vagina crosses the ovary on the pore side in some segments, and other forms in which the very large genital papilla is practically as long as the margin of the narrow segments. Tapeworms of comparatively restricted geographic distribution and occurrence, not cosmopolitan. Bladderworms in the edible musculature of important food animals. Parasites of some economic importance14
- Forms in which the vagina does not cross the ovary on the pore side, and in which the genital papilla is never nearly as long as the margin of the segments15
14. Gravid uterus with 20 to 25 lateral branches on each side of the median stem. Vagina crosses the ovary on the pore side in some segments. Genital papilla much shorter than the segment margin. Bladderworm in musculature of sheep*Taenia ovis*.
 Gravid uterus with not over 10 lateral branches on each side of the median stem. Vagina does not cross the ovary on the pore side of the segment. Genital papilla practically as long as the lateral margin of the narrow segments. Bladderworm in the musculature of reindeer....
 *Taenia krabbei*.
15. Forms with the large hooks from 170 to 294 μ long. Tapeworms of cosmopolitan distribution and common occurrence. Bladderworms attached to omenta, mesenteries, or peritoneal serosa.....16
- Forms with the large hooks 135 to 145 μ long. Rare tapeworms only reported once and under conditions indicating that they are accidental parasites of the dog. Life histories unknown.....17
16. Large hooks 225 to 294 μ long. Testes extend posterior of the vitellarium. Mature segments approximately square. Gravid segments with 8 to 14 lateral branches on each side. Vagina only slightly dilated and curved near margin of segment. Bladderworm in rabbits, rarely in mouse or beaver*Taenia pisiformis*.
 Large hooks 170 to 220 μ long. Testes do not extend posterior of the vitellarium. Mature segments distinctly wider than long. Gravid segments with 5 to 10 lateral branches on each side. Vagina forms a sort of crescent by dilation and curvature near lateral margin of segment. Gravid segments with a median longitudinal groove terminating in a notch posteriorly. Bladderworms usually in ruminants, also reported from monkeys and rodents.....*Taenia hydatigena*.
17. Guard of small hooks twisted so that its flat surface tends to lie in the plane of the blade and handle*Taenia brachysoma*.
 Guard of small hook not so twisted.....18
18. Head acorn-shaped, with hooks far anterior of the suckers. Mature segments approximately square*Taenia balanicæpa*.
 Head not acorn-shaped, and hooks not far anterior of suckers. Mature segments distinctly broader than long*Taenia brauni*.
19. Strobila not over 25 mm. long; rostellum with 4 circlets of hooks, the hooks 45 μ long and with a handle and guard; the cirrus pouch opens

- ventral of the vagina; 1 egg to each egg capsule.....
 *Dipylidium trinchesei*.
 Strobila 5 cm. long or longer; hooks rose-thorn-shaped20
 20. Head with 16 cirrelets of hooks; strobila 12 to 20 cm. long; 45 to 50
 small testes; cirrus pouch 250 to 260 μ long and crossing the longi-
 tudinal excretory canals; vitellarium roughly spherical and smaller
 than the ovarian lobes; 1 large egg, 52 to 53 μ in diameter, in each
 egg capsule *Dipylidium chyzeri*.
 Head with not over 6 rows of hooks; 90 or more testes; 2 or more eggs in
 each egg capsule21
 21. Heads with 6 cirrelets of hooks; strobila 10 to 23.5 cm. long; 130 to 140
 testes; cirrus pouch extends to the longitudinal excretory canals;
 the median ovarian lobes crescentic, the lateral spherical; the vitel-
 larium reniform and as large as an ovarian lobe; egg capsules with 2
 to 15 eggs and at times extending lateral of the longitudinal excre-
 tory canals *Dipylidium sexcoronatum*.
 Heads with 3 to 5 cirrelets of hooks; cirrus pouch extends across the ex-
 cretory canals regularly or occasionally; vitellarium smaller than the
 ovarian lobes or smaller than the median ovarian lobes.....22
 22. Head with 5 cirrelets of hooks; strobila 5 to 11 cm. long; 90 to 100 large
 testes; cirrus pouch curved, convex posteriorly and extending dis-
 tinctly across the longitudinal excretory canals; vitellarium smaller
 than the ovarian lobes; spindle-shaped receptaculum seminis present;
 vagina opens posterior of the cirrus pouch aperture; eggs 25 μ in
 diameter *Dipylidium oerleyi*.
 Head with 3 to 4 cirrelets of hooks; strobila 15 to 40 cm. long; 100 to 200
 testes; cirrus pouch piriform and extending to and occasionally across
 the longitudinal excretory canals; no receptaculum seminis present,
 the oviduct showing a compensatory dilation; vagina opens ventral
 of the cirrus pouch aperture; eggs 43 to 50 μ in diameter.....
 *Dipylidium caninum*.

Very successful reports are given of the Practitioner's Short Course in Veterinary Medicine, held at Ames, Ia., September 4 to 9. Aside from the local faculty, assistance was rendered by Dr. J. W. Adams of Pennsylvania and Dr. D. S. White of Ohio.

The meeting of the Massachusetts Veterinary Medical Association was held at Springfield, Mass., October 18, during the National Dairy Show. Among the speakers were Doctors V. A. Moore, E. C. Schroeder and W. Horace Hoskins. A very successful meeting was reported.

Dr. Percy Lamb of Englewood, Colorado, is planning a trip to England.

ARE UNIFORM REGULATIONS FEASIBLE AMONG THE DIFFERENT AMERICAN COUNTRIES FOR THE PREVENTION OF THE INTRODUCTION AND DISSEMINATION OF DISEASES OF ANIMALS?

Abstract of paper by Dr. A. D. MELVIN, Chief of the Bureau of Animal
Industry, Washington, D. C.

The growth in commerce in live stock and animal products has greatly increased the danger of the spread of contagious animal diseases. The need for protection against this danger has led to the formation of live stock sanitary police organizations in most countries where the live stock industry has been developed. The object of such organization is (1) to protect domestic live stock from foreign contagion, (2) to prevent the spread of animal diseases within the country, and (3) to eradicate such diseases as may be present.

The nations of the western hemisphere are being drawn closer together by ties of common interest and growing commerce, and it seems very desirable for them to enter into some kind of cooperation for the exchange of information with regard to contagious diseases of animals, and so far as practicable to adopt uniform regulations for preventing the spread of such diseases.

The different conditions in the different countries would probably make an absolutely uniform set of regulations for all American countries impracticable. It should be possible, however, to have uniformity in certain fundamental features. Without attempting to formulate an exact plan we may point out certain fundamentals that should and doubtless can be followed.

1. As a first step, each country engaged in commerce in animals and animal products with other countries, or that wishes to engage in such commerce, should organize a competent veterinary sanitary service, if not already provided with such a service.

2. The veterinary service should make a thorough survey of the country so as to determine what contagious diseases of animals are present and the regions where they prevail. The collection of such information should be continued as a routine feature so that the service may be constantly informed of live stock sanitary conditions throughout the country.

3. Laws and regulations, if not already in existence, should be carefully framed and adopted with the object of preventing the spread of contagious diseases within the country and preventing the transmission of such diseases to other countries with exported live stock. If meats are to be exported there should be regulations and an inspection system insuring their wholesomeness. There should also be laws and regulations for the inspection and quarantine of imported animals to prevent the introduction of diseases and parasites.

The foregoing features are already in effect to a greater or less degree in many countries.

4. A further very desirable step would be a system for the interchange between the various governments of information regarding the presence or absence of contagious diseases of animals. In order to establish such a system, as well as to bring about greater uniformity in regulations, it would be well to have a commission of representatives from the various countries. Such a commission might endeavor to formulate regulations that would be generally applicable and serve as a model for adoption by the several governments. Such a draft of regulations should be as brief and simple as practicable and should deal mainly with fundamentals or essentials, leaving details to be developed according to local conditions in the various countries.

The veterinary service of each country should endeavor to eradicate the diseases existing there. The proposed plan for the interchange of information might very well include the exchange of information as to methods successfully followed in combating animal diseases.

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DR. JULIO BESNARD, Chief of the National Veterinary Service, Chile.

There are no reasons within our knowledge which oppose themselves to the establishment of uniform general regulations to be adopted by the different American countries with the object of impeding the penetration of contagious diseases of animals into territories up to this time protected against one or the other of such diseases.

If there are any American countries which owing to certain reasons of a special nature are particularly menaced by one or more of its neighbors with the invasion of diseases which it specially fears, that country can conclude an agreement with such neigh-

bor or neighbors with the object of making the existing regulations more severe.

We will explain with more precision this idea, applying it especially to Chile.

There is no treaty between this country and Chile in the matter of sanitary police, and for that reason general regulations are acceptable to-day without impediment. We avail ourselves of this opportunity to declare that we are certain that we interpret the opinion of the Chilean Government and of the Chilean farmers when we say that they would experience the greatest satisfaction if given the opportunity to collaborate in the adoption and application of such important measures of mutual protection.

The Republic of Chile has only three neighboring countries—the Republics of Peru, Bolivia, and Argentina. The first two are not producers of cattle in the more or less arid regions which form their frontiers; only the Argentine exports animals to Chile by the land route across the Andes. All the others make their importations by way of the sea.

It would therefore be in accordance with our suggestion to establish a special convention between these two Republics at the same time that both of them adhere to the general regulations.

CONCLUSION. We may admit that Chile would enthusiastically support an American convention which had for its object the prevention of the introduction and propagation of the diseases of animals.



DR. RAFAEL MUNOZ JIMENEZ

The importance of the stock industry in the American countries and the increased number of diseases which tend to destroy the source of wealth have obliged the majority of nations of the continent to pass laws to prevent the introduction and propagation of animal diseases. But in order that such results may be obtained, a harmonious plan of continental scope should be adopted. Such uniform regulation would bring not only advantages of a sanitary nature, but would contribute also to the freedom of commercial exchange; for confidence in such measures would result in the removal of restrictions on the free importation of live stock.

Moved by these considerations, the Republic of Uruguay convened an International American Conference of Veterinary Police

which met in the city of Montevideo in 1912, and in which the Governments of Uruguay, Argentine, Brazil, Chile, and Paraguay took part. A convention was signed by the representatives of the several countries mentioned, providing for the organization on their borders of a veterinary police sufficient to prevent the passage of diseased animals across their respective frontiers. In this convention we have the beginnings of a system of regulation. But the regulations adopted at Montevideo ought to be improved and extended. The adoption of such a project as the author's, presented by the delegation of Uruguay, to the conference of 1912, and meeting with the general approval of that body, would effect the desired result.

The project of regulation proposed by Dr. Rafael Munoz Jimenez is set forth in great detail under the following heads: (a) Sanitary measures to be employed on the frontiers, (b) internal police regulations, (c) special police measures of an international character.

In order that the extensive scheme proposed should be carried into effect, the author suggests that a second international conference should be held, in which all or at least a majority of the American nations should be represented.



DR. FRANCISCO ETCHEGOYEN

Veterinary medicine has enjoyed great progress in American countries. Their action, however, is impeded when the appreciation of the Governments is lacking in matters relating to sanitary police.

In Cuba the subject began to receive attention in the first American intervention, and much progress has been made since then.

The tendency of the human race to multiply faster than the means of subsistence imposes the necessity to conserve, augment, and improve the breeds of cattle. It is not sufficient to line the frontiers with inspectors to refuse admission to diseased cattle. The avoidance of disease is not solely a question of sustaining health; it is the most important factor in the propagation of species. Thus considered, the cattle problem is the great problem of the world. Is it possible to realize the solution of this problem by cooperation between the Pan American countries? No, if each country simply confines itself to defending itself behind a Chinese wall against infection from the outside. Yes, if the different coun-

tries can arrive at an agreement about sanitary methods of developing and breeding domestic animals. Something similar to this has been done in human medicine with yellow fever. Yellow fever has ceased to be a source of anxiety in the United States, and our population has duplicated in a short time.

The same campaign against other epidemics would arrive at identical results, and applied to zoology the effects would be more rapid.

In the present advanced state of medical science we can say that there is not a human pathology and a veterinary pathology, but a comparative pathology. The same diseases attack both the lower animals and man, their action being determined rather by the regions than by the animal species.

From the time that the germ theory of disease has been accepted, not all the contagious diseases have been listed. There are lacking some diseases transmissible to man, many others contagious among animals, and others which, without being transmissible from animal to animal, produce great mortality in them. Lack of agreement concerning the cause and modes of transmission of diseases among animals, including man, implies lamentable carelessness in the prophylaxis and extinction. Action should be extended to all those diseases which produce abnormal states in the same species or distinct species. Each country will have to revise a study of these diseases and consider the methods convenient for combating them, submitting the result of their investigations to a directive international committee charged with the duty of unifying the results. The author then gives a list of the diseases of his country, Cuba, transmissible by parasites, microbes, and filterable virus.

The endozoarians and ectozoarians indicated are identical with those of Europe and America where our cattle originated.

What measures do we oppose to so many ravages? The most efficient is that employed against glanders. Anthrax is combated with vaccination, hog cholera with the simultaneous use of virus and serum, rabies with the Pasteur treatment in the human species. These sole prophylactic means are not sufficient to destroy the foci.

The medico veterinary body of Cuba would see with pleasure that the Pan American Congress recommend uniform methods for the defense of *cattle*.

The author concludes that the importance of the subjects of the breeding of cattle and their defense against disease merits the

consideration of a treaty concerning joint sanitary action. These commissions would realize experimental investigation and send results to the directive committee. It should be the obligation of such committee to formulate the prophylactic and curative regulations. The author quotes from Dr. Monlau, finally saying, "Sanitary codes *** are as urgent and important as civil and criminal codes, with which they have more than one point of relation and contact."

EPITHELIOMA CONTAGIOSUM OF QUAIL

BERNARD GALLAGHER

From the Pathological Division, of the Bureau of Animal Industry,
Washington, D. C.

Epithelioma Contagiosum Avium or bird pox is an infectious epizootic disease, which has been shown by recent investigators to be identical with avian diphtheria, the causative organism being capable of producing either the hyperplastic epithelial nodules characteristic of the former or the croupous and diphtheritic pseudo-membranes on the mucous membranes of the head associated with the latter. The disease is one of the most common and destructive affections of fowls, and occurs to a lesser extent in turkeys, pigeons and several other species of birds. The writer has failed to find pox or diphtheria of quail recorded in the literature, and reports this case because of the large number of birds affected and the severity of the attack. Four hundred birds were under observation, and the mortality during a period of five weeks amounted to 85 per cent.

Approximately 15,000 live quail were received from Mexico during December, 1915, and January and February, 1916, principally for the purpose of stocking game preserves. Each shipment is quarantined at a designated point on the border for a period of ten days under the regulations of the Bureau of Biological Survey, of the Department of Agriculture, and under the direct supervision of a veterinary inspector of the Bureau of Animal Industry. The lot of 400 referred to in this paper were received during January, and showed no indication of pox during the period of quarantine. They were shipped to Kansas City, where they developed a condition which made them unsalable, and were for-

warded by the importer to the Pathological Division for diagnosis, and experimental purposes.

Quail are found in large numbers, in the wild state, in Mexico, and are captured by Mexican trappers. They are shipped in crates holding about 75 to 80 birds, and although these crates are specially designed to guard the birds against injury, frequently a large percentage of the shipment will show skinned heads from jumping against the roof and sides of the crates when frightened. In the present instance a great many had lost feathers and skin from the top of the head, and had also injured the flesh at the tips of the wings. Frequently, the top of the head was completely denuded of skin, the surface of the skull being exposed over an area as large as a dime. The abnormal conditions to which the birds were subjected, especially the close confinement during transit and change of climate during the winter season, no doubt lowered their vitality and rendered them more susceptible to disease. Also the areas where the skin was lacerated served as good points of entrance for the virus of bird pox.

SYMPTOMS AND LESIONS. All manifestations of the disease were exhibited during the course of the outbreak. In some cases the eyes alone became affected, in others the diphtheritic exudate was found in the nasal passages and in the mouth. In the majority of the birds typical bird pox lesions were observed on the skin of the body, especially on the wings and around the lacerated skin of the head. In many cases all lesions mentioned were present in the one individual.

Externally the disease was manifested by the presence of nodules similar to those found in chicken pox, but with a tendency to spread out over the skin to a greater extent. The upper surface of the head and the tips of the wings showed the most severe involvement, due to the previous traumatic injuries sustained by the skin at these points. In some cases where no injury was present about the head, no wart-like process had developed. The scabs were closely adherent, and on removal left an abraded surface, except in the event that the nodules were old when the scab came away readily leaving a well formed scar. In a fairly large per cent of the birds, one or both eyes were the seat of cheesy deposits beneath the eyelids, the pressure being so great in some instances as to destroy the eye.

Internally marked diptheritic patches were present on the hard palate, around the base of the tongue and on the wall of the pharynx. Small patches, the size of a pin-head, were distributed over the mucous membrane of the mouth. The nostrils were often closed by necrotic material, necessitating breathing through the mouth. Also the infra-orbital sinus was occasionally involved, the accumulation of cheesy exudate giving the head a swollen appearance. The croupous membranes in the mouth were usually closely adherent to the mucosa and when removed left uneven inflamed surfaces.

TRANSMISSION EXPERIMENTS. *Non-Filtered Virus.* A number of animal inoculation experiments were carried out to determine the relation between bird pox as observed in quail and bird pox of chickens. Quail pox nodules and also quail diptheritic material from the mouth were rubbed into emulsions with small amounts of normal salt solution. In one series of experiments, the emulsions were spread on slightly scarified surfaces of the combs and wattles of young fowls. In each case characteristic pox nodules developed at the points of inoculation after a period of six to eight days. It was noted, however, that the lesions were not as extensive or as pronounced as those which the writer has produced by artificial inoculation of chicken pox from fowl to fowl. This would suggest that the virus was more highly specialized for quail, although it may have been originally derived from fowls and become attenuated by passage through the quail.

In a second series of experiments the pox and exudate emulsions were rubbed on slightly scarified areas of the oral mucous membranes of half grown fowls. Typical croupous patches appeared after a period of seven days.

In a third experiment two fowls were given 0.5 c.c. of each of a diluted emulsion of pox and diptheritic exudate intravenously. No results followed the injection, possibly as a result of the diluted virus, or a natural degree of resistance on the part of the birds to this method of inoculation.

Filtered Virus. To determine whether the causative agent of quail pox is a filterable virus as has been demonstrated for the causative agent of chicken pox, a highly diluted emulsion of pox lesions and oral exudate was passed through a Berkefeld filter by vacuum aspiration. The resulting filtrate was determined to be

free of visible organisms by microscopic examination, and cultural media inoculated with the filtrate remained sterile.

A series of experiments similar to those conducted with the non-filtered emulsions were carried out. No results followed inoculations of comb and wattle, or intravenous injections. In one of the fowls which received an oral inoculation two patches about the size of a pin head appeared on the mucous membrane of the pharynx after an eight day intermission. It is quite likely that these lesions were due to intercurrent causes as a result of the slight scarification of the membrane. Assuming that the virus of quail pox is identical with that of chicken pox, failure to transmit the disease to fowls with a Berkefeld filtrate of quail pox material may be due to the high dilution which was used to facilitate the passage of the fluid through the filter and to a greater resistance on the part of fowls to a virus which was more or less specialized for quail.

Further experiments with filtered and non-filtered emulsions of quail pox material were attempted with material which had been kept in the dried condition, and also in glycerine, for a period of six months. No results followed and it is concluded that the virus had become greatly attenuated or destroyed during that time.

Dr. R. F. Eagle, superintendent of the Oklahoma City plant of the Wilson Packing Co. has been promoted to be assistant general superintendent of the whole Wilson Packing Company with headquarters at Chicago. Dr. Eagle attributes his success to his veterinary training. The veterinarians of the United States congratulate Dr. Eagle and wish him continued success.

TORONTO MAN WINS CROIX DE GUERRE. Flight Sub-Lieut. Rochford Grange Decorated by French Government. The news that Flight Sub-Lieut. Rochford Grange, Royal Naval Air Service, has been awarded the Croix de guerre by the French Government has been received by his father, Principal E. A. A. Grange, of the Ontario Veterinary College. Lieut. Grange was graduated from the School of Practical Science in 1915. He underwent a course of training at the Curtiss School of Aviation at Long Branch in the summer of 1915 and left for England in October of that year. He completed his preparation for service with the Royal Flying Corps in England and was sent to France in February, 1916.

AMERICAN RECORDS OF *DICTOPHYME RENALE*

By MAURICE C. HALL, Ph.D., D.V.M.

Parasitologist, Research Laboratory, Parke, Davis & Co., Detroit, Mich.

Just recently Riley (1916) has compiled the record of American cases of the giant kidney worm, *Dictophyme renale*, from the dog in connection with the publication of some new cases which came under Professor Riley's observation. On looking over my reprints I find two other records which were published in places where Professor Riley would hardly be likely to find them. In order to complete his list—if this does complete it—the two records noted are summarized here, and another case recorded.

Halsted, (1909) in an article on transplantation of parathyroid glandules in dogs, covering work done at Baltimore, Maryland, notes in the case of one animal, an old dog, the following:

"Autopsy. Made and dictated by Dr. Hennington. Heart and lungs normal. On opening the peritoneal cavity an extravasation of blood into the omentum was observed and, on more complete exposure, a large round worm (*Eustrongylos gigas* or *Dictophyme renale*) (?), 90 cm. long and 1 cm. in diameter, presented itself free in the peritoneal cavity in the neighborhood of the spleen. It was still alive and on being placed in warm water, executed slight movements. The intestinal peritoneum was thickened and granular looking. The parietal peritoneum presented in places small, indefinitely circumscribed, roughened areas. More careful examination of the omentum showed that the extravasated blood followed the ramifications of the blood vessels. The liver presented on its surface whitish nodules one to three millimeters in diameter. ***The surface of the spleen was slightly roughened. *** Kidneys quite normal in appearance."

When females of *D. renale* occur in the kidney of the dog, the eggs produced by the worms pass out in the urine. On the other hand, when these females occur in the peritoneal cavity, and Halsted's case is undoubtedly such a case, the eggs are passed to the peritoneal cavity where they act as irritants and become attached to the peritoneal surfaces by small adhesions which are visible macroscopically as roughened areas. It is probable that the roughening of the parietal and visceral peritoneum noted by Halsted was due to this cause.

The other record of *D. renale* from the United States is that of Baker (1916) and consists of remarks made before the Twentieth Annual Convention of the Indiana Veterinary Medical Association as follows:

"That suggests an interesting discovery that we made in our dissecting room a few days ago. We sent over to the dog pound for thirty-six dead dogs for the juniors to dissect. Floating free in the abdominal cavity of one was the longest specimen of the *Eustrongylus visceralis* I ever saw. It was about $\frac{5}{8}$ of an inch in diameter and twenty-nine inches long and blood red. I measured it myself. Twenty-five years or more ago I found two on post-mortem in the same place, in the abdominal cavity of a dog. One was about 12 inches long and the other was 14. The short one was $\frac{5}{8}$ of an inch in diameter and the other was $\frac{3}{4}$ of an inch in diameter and blood red. You will find it described in the books."

Baker's records undoubtedly deal with cases of *D. renale*. Riley has noted that not all of the published cases listed by him can be accepted. He very properly rejects all the human cases. Breeder's case must be listed as doubtful. The number of worms present, 21, and their length, 9 to 12 centimeters, is more suggestive of lumbricoid worms present in the abdominal cavity as the result of perforation of the intestine. The kidney lesions are puzzling. They are not the typical lesions due to *D. renale*, but in the absence of adequate data as to the worms themselves, it is perhaps as well to regard the case as unproved one way or another.

An unpublished case of the occurrence of *D. renale* has just come to my attention. While at Ann Arbor, Michigan, recently, Doctor La Rue of the University of Michigan showed me a large male of this species which had been collected at Ann Arbor about a year previous.

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CLINICAL AND CASE REPORTS

"Knowledge is born in laboratories and in the experience of the thoughtful. It develops form in the journals and 'when dead it is decently buried in books'."

TABULATED RECOMMENDATION FOR METHODS OF CONTROL OF WHITE SCOURS (DYSENTERY NEONATORUM) IN CALVES.

A. T. KINSLEY, Kansas City, Mo.

White scours is the name of a fatal disease of new born animals, the principle symptom of which is diarrhoea in which the discharge is white or whitish in color. This disease affects all animals, but is most common in calves. It has been investigated in Denmark, Holland, Germany, Belgium, Italy, France, England, Ireland and America.

All investigators agree that the disease is of bacterial origin. The following bacteria having been identified with this disease: *B. coli communis*, *B. aerogenes*, *B. paracoli*, *B. pyocyaneus*, *B. proteus*, *B. bipolaris* and various pyogenic micrococci. The *B. coli communis* is the most common bacterial invader in these cases. All of the bacteria before mentioned are found in the discharges of cattle and other animals and therefore infection of the new born is easily accomplished. The most common avenue of entrance of infection is through the digestive tube or the umbilicus, more rarely through other channels, as respiratory or genito-urinary organs.

Knowing the causative agents and the avenue of infection it would not seem to be difficult to control this disease, however, its ravages have continued almost unabated. The following suggestions are offered as a possible means of combating this disease:

A. Sanitary measures.

1. Properly located barns and yards in order that there is good drainage.
2. Construction of barns and other buildings that facilitate cleaning and keeping clean.
3. Frequent hauling out and proper disposal of manure.
4. Clean wholesome water provided.
5. The cow maintained in a cleanly condition prior to and for some time after parturition.
6. Cleaned and disinfected stall or pen for parturition and for occupancy of cow and calf for from 1-3 days thereafter.
7. Cleaned and disinfected stall or pen for calf if pasture land is not available until the calf is one month of age.

8. Diminish possibility of infection of suckling calves by keeping teats and udder of cow clean.
 9. Prohibition of infection of hand fed calves, by preventing infection of milk.
 10. Quarantine of all affected animals.
- B. Preventive measures.
1. Immunization of cow just prior to parturition by the injection of two or more doses of a mixed bacterin.
 2. Immunization of calf with mixed bacterin first day of life.
 3. Provision of colostral milk for new born calf.
 4. Provision of proper food and feeding at proper intervals.
 5. Use of intestinal antiseptics persistently.
 6. Isolating of animals at the first indication of disease.
- C. Curative measures.
1. Production of temporary immunity by use of polyvalent serum. This has not given universal satisfaction.
 2. Immunization by use of mixed bacterin. This line of treatment has proven of value in all except very acute cases.
 3. Using of intestinal antiseptics and when indicated, laxatives, stimulants or other medicaments.
 4. Careful regulation of the diet.

ARTERIO-VEINUS ANEURISM OF THE SPERMATIC CORD IN AN OX.

BESNOIT AND CUILLE

Arterio-venous aneurism, characterized by a permanent communication between an artery and a vein, though not altogether exceptional in domestic animals, is not by any means of frequent occurrence. Interesting reports on this subject have been made by Chauveau (1863), Collin and Lesbree (1881), Moreau (1895), Dubois (1907) and others. In bovines the lesion is usually located on the face, near the vessels of the forehead; frequently on the limbs, at the level of the collateral vessels of the cannon. It may be found almost anywhere, especially where the vessels are exposed to trauma, contusions, etc. It has frequently been found in the scrotal region and Collin and Lesbree especially, have described a very remarkable example of typical arterio-venous aneurism of the spermatic cord. A recent case which we describe is practically identical with that of Collin and Lesbree.

The affected animal was four years old. It puzzled the attendants greatly and because of certain symptomatic peculiarities, was nicknamed the "motor ox." On the right, at the level of the

scrotum, there was an enormous pulsating tumor, animated by strange, violent, rhythmical movements, which recalled to the eyes of the "vulgar", the regular shocks and trepidations of the motor of an automobile.

The symptoms were those of the classical arterio-venous aneurism. There was a scrotal tumor, of the volume of two fists, almost cylindrical in form, about 30 centimeters long, hanging vertically between the posterior limbs, like the testes in a bull. It was not sensitive, but soft, very elastic and reducible to the pressure of the fingers. It was animated by violent pulsations, synchronous with the cardiac systole, which were perceptible even to the eye, and shook the entire scrotal mass. Palpation disclosed the characteristic, almost pathognomonic sign of arterio-venous aneurism; the vibratory trembling of the French writers, or the thrill of the English writers. This sign is composed of two sensations; the one a tactile, giving the hand the impression of a fine and rapid vibration, similar to the shaking of windows by the passage of a heavy vehicle; the other, auditory, like the humming of bees or a spinning top. It was continuous, but with a considerable reinforcement, corresponding to the cardiac systole. Attaining its maximum intensity at the base of the scrotal sac, it was propagated through the entire height of the lesion, and was still distinctly perceptible at the inguinal ring. Finally, compression exercised at the base of the sac diminished the concussions and trembling, but they did not disappear entirely.

An anatomical study of the lesion was made, post mortem. The animal, in remarkably fine flesh, did not seem to have suffered from the lesion. A minute dissection of the scrotal region entirely confirmed our diagnosis, and disclosed the following: The lesion was limited to the spermatic cord and involved only the spermatic artery and vein. The two vessels were not equally affected. The artery, very dilated, had an average diameter of a small finger; its walls seemed to have conserved their normal resistance and were not thinned. The vein, on the other hand, was profoundly altered. When injected with water it seemed stretched, sinuous, and extraordinarily dilated. Its diameter varied from 3 centimeters at the narrowest parts up to 6 and 8 centimeters toward the lowest parts of the scrotum, where it formed two enormous ampoules separated by a slight constriction, and which contributed in forming the large cylindrical tumor, observed in the living animal.

The dilation was not limited to the scrotal part of the vein, it was 4 centimeters in diameter 50 centimeters from its extremity, it could be noticed in the abdominal cavity and sublumbar region. The walls of the vein were not thinned, they were, perhaps, somewhat reinforced by a thin layer of sclerotic connective tissue. In order to demonstrate the communication between the two vessels water was injected into the artery, instantly the liquid passed into the vein and dilated it to its former dimensions.

PATHOGENESIS. There can be no doubt about the aneurism originating from castration. The cicatrices on the scrotal sac showed that castration by the "bloody method" had been performed, although castration by torsion is the usual method in Central France. The pathogenesis is easily understood. After the castration, a small quantity of arterial blood diffused into the intrascrotal connective tissue, forming a small hematoma which formed a cavity with which the open ends of the cut vessels communicated. Then, by the progress of the cicatrization and the retraction of cicatricial tissue, the connecting cavity became smaller and smaller, until it finally disappeared, bringing about the adjustment and finally the union of the two neighboring vascular trunks.

In this way three regular anatomical stages of arterio-venous aneurism succeeded one another. First—in the beginning, the varicose aneurism, characterized by the presence, between the artery and vein, of a newly formed sac developed around a clot. Second—after the disappearance of the sac by cicatricial retraction, the simple phlebartery or aneurismal varix, an arterio-venous fistula; characterized by the absence of the sac and the approximation of the artery and vein at the level of the orifice of communication. Third, and finally—as the result of the progressive dilation of the venous walls under the influence of the augmented venous blood pressure due to the incessant pounding of the arterial blood, there results a varicose aneurism by dilation, in which the sac is represented by a distension, more or less pronounced, of the vein. This was the last term in the curious process that took place in our patient.

What should be done in such a case? The lesion had existed for several years and seemed to exert no untoward effects on the animal. Undoubtedly, it would have remained stationary indefinitely, and even if it had developed very slowly, its progress would have had no serious consequences. No intervention is indicated,

although ablation has been performed successfully on bovines, it is perfectly useless.—*Revue Générale de Médecine Veterinaire* XXV. 1916.

BERG.

AN UNUSUAL CASE

C. B. PERKINS

February 6th. Was called at noon to see a nine year old gray mare which was too lame to be backed out of the stable and had fallen once in the attempt.

History—Owner said that the mare had been in the best of health the day before, was not lame and ran and played when turned out to water. On going to the farm February 6th, he found her too lame to be backed out of the stall. He remembered that on February 4th he had made her jump forward quickly to start a gasoline tractor to which she was harnessed but no lameness was noted to follow the attempt.

Symptoms—Temperature 101.2, pulse 60, respiration 16. Skin showed patches of sweat and was very wet and cold. When urged to move she exhibited great pain. After a great deal of effort we were able to get her out of the stall. She walked to the water tank but with great pain and effort. Most of her weight was thrown on the left leg. I made a close examination of the foot but found it in good condition. Examined the entire limb and found nothing until reaching a place on the inner aspect of the thigh at a point on a line with the patella. Here the mare exhibited sensitiveness. There was some heat and swelling but very little. I next made a close examination of the pelvis per rectum but found nothing. The mare then walked into a shed and began to eat hay, resting on the right toe on the ground. I again felt of the tender spot which caused her to flinch and hold up the foot.

I instructed the owner to bathe the part well and left some white liniment (strong) to apply after the hot water. I left directions to be called if there was no improvement.

February 8th. The owner called me and reported improvement, so I dismissed the case.

February 15th. The owner again called and said the mare was down and worse. I put in slings and drove out. When I arrived I found her up eating. She had evidently laid down to rest

and got up unassisted. I made a second rectal examination and as before found nothing. The spot on the thigh was still sensitive but not more so than before and she was not quite so lame.

Temperature 100.5° F., pulse 42, respiration 12. Stood eating hay although she would at times raise her right foot up and look around at it. I examined the foot again but found nothing. Left liniment as before and as condition was good gave no internal medicine.

February 28th. Owner called and said mare was down and could not get up. Took out slings and tried to raise her but could not. Temperature 101° F., pulse 42, respiration 12. The mare was greatly reduced in flesh and the entire right limb had become greatly atrophied; the lower portion was cold and slightly swollen. I endeavored several times to raise her but failed. She would not bear any weight on her right leg and seemed to have no use of it, and the left was but little better.

Diagnosis—I made none the first trip but offered the opinion that there was a "strain of the group muscles about the stifle." On the last trip I decided that there must be a thrombus in the iliac arteries, as the arteries on rectal examination seemed to have a peculiar feel, the pulse in them was weak, feeble, and the condition of the limb cold and swollen. I had not taken into consideration that she had laid on the right leg for twenty-four hours.

Prognosis—I told the owner on the last trip that I could do nothing and asked for a consultation. He said he had faith in me and would destroy her the next day if I advised it. I insisted that he call another man, some legal practitioner.

Dr. R. was called and his diagnosis was "fracture of the distal end of the femur just above the stifle joint." Some crepitation could be heard we thought.

The mare was destroyed and the findings were as follows:

There was no pus in the stifle joint although it contained a bloody, brownish fluid which filled the joint capsule. I found no fragment of bone or even sediment which might have been broken off. There was apparently very little congestion or inflammation about the joint. Post mortem diagnosis was "Acute Gonitis."

—*The Veterinary Alumni Quarterly, O. S. U.*

POISONING WITH SOLANUM DULCAMARA? BITTERSWEET

D. H. UDALL AND F. F. KOENIG, Ithaca, N. Y.

During the past year a small farmer has lost two cows and a horse after a sickness of about two weeks, with symptoms of fetid bloody diarrhea and prostration.

According to the owner the present case, a grade milch cow, had been eating bushes at pasture. On examination these were found to be *Solanum dulcamara* (bittersweet; blue nightshade). She was taken sick on the 17th, showing depression, stiffness, and diminished milk secretion.

Symptoms. Depression, good condition, skin normal. Pupil dilated; m.m. pale. P. 45-50. R. 30. T. 100.6 *Dig. Sys.* No appetite for food or drink; salivation present; peristalsis normal; percussion painful over right abdomen, left normal; feces contained numerous gas bubbles; grunting with each breath.

Treat. Ammon. carb. 5 iv, ol tereb 3 i, creolin 3 i. Prescribed R Liq. acidi arsenosi, liq. strychninae aa xii, tr. ferri chlor. i. M. Sig. 3 i three times per day. Acid tannic 5 iv daily. Creolin 3 iv once daily in a quart of water. July 20 owner reported a marked improvement. An infusion of a small bush given to a cow as a drench proved negative. Further experiments are contemplated.

Discussion. The symptoms of enteritis in this case—diarrhea, pain, pain on percussion in region of abomasum, harmonize with the usual form of enteritis due to faulty feed. The past history of similar cases in animals having access to blue nightshade in the same pasture, combined with the knowledge that this cow ate the nightshade is very suggestive. Our literature on the subject is brief. Halsted¹ mentions its relation to black nightshade, and states that it abounds in *solanine*, the narcotic poisonous principle. No reference is made to its effect upon stock. A similar brief description is found in Farmer's Bulletin No. 86, by Chestnut. Lander² refers to poisoning in sheep with symptoms of a small intermittent pulse, temperature 104° F., quickened respiration, dilated pupils, staggering gait, and greenish diarrhea. Fröhner³ states

1. The Poisonous Plants of New Jersey.
2. Veterinary Toxicology.
3. Lehrbuch der Toxicologie.

that animals are poisoned with solanin obtained from eating potato vines, and that *Solanum nigrum* (black nightshade) is also a cause of poisoning, but that poisoning has not occurred from eating *Solanum dulcamara* (blue nightshade).—*Cornell Veterinarian*.

A SUGGESTION IN CONNECTION WITH THE OVAR-IOTOMY OPERATION ON THE BITCH AND CAT

HARRY FREDERICK, Suffern, N. Y.

The procedure I describe here has no doubt been used by many beside myself, but as there are probably many others to whom it has not occurred, I feel certain it will do some good. If you have had the misfortune to have a nice operation set back several days by the stitches being torn out and the wound breaking open, you can easily prevent this by a simple method.

You may say at this point—"that is easy—just bandage"; but it is not enough to bandage, unless you use the right kind of bandage. The ordinary bandage we used at college, before I graduated, I have never found sufficient.

Here is what I do. Procure a piece of clean white linen, muslin, or any cloth for that matter. Just before the operation, cut it to fit the animal by measuring from its head to the lumbar region, for the length and have it wide enough to a little more than go around the body. Cut out two holes for the front legs and it is ready to use when the operation is completed. When in place, it can be fastened over the back, either by safety pins or by tearing it into several tails and tied as any "many-tailed" bandage. I place a liberal sized piece of cotton with powdered boric acid upon it, next to the wound and when the bandage is drawn up against it, much strain is taken off the stiches, and the wound kept clean. The animal cannot get at the stitches.

If anyone has tried some other method that he considers better, I would be glad to hear from him through the *Journal*.

Dr. H. W. Willis has removed from Columbia, Tenn. to Richmond, Ind.

Dr. T. M. Bayler has removed from Chicago to Perry, Iowa.

ABSTRACTS FROM RECENT LITERATURE

TREATMENT OF STRANGLES, ANASARCA, AND INFLUENZA BY INTRAVENOUS INJECTIONS OF PHENOL AND GUAIACOL. Poret. *Recueil de Médecine Vétérinaire*, Vol. 92, pp. 261-267, 1916.—There is a tendency to proclaim the uselessness of antiseptics. I cannot believe this in view of the clinical results, and furthermore, because of the considerable difference in the action of a medicament in vitro and in close contact with the organic elements where it is brought by the blood circulation.

For this reason, the following observations are communicated, confirming the good results obtained by the intravenous injections of solutions of phenol and guaiacol.

What is guaiacol? It is a constituent of creosote, four times as active as phenol, less toxic, sparingly soluble in water, soluble in alcohol and in glycerin; the last of these seems to remove its antipyretic action.

The therapeutic doses of guaiacol per os, are 5 to 10 grams for a horse; 5 to 15 grams for cattle. None of the horses that received guaiacol showed symptoms of poisoning. All that I could notice was a slight sleepiness during the injection; frequently this occurred shortly after. In only one case, a horse had difficulty in getting up on the night following the first injection; I suspect this to be a case of founder.

Guaiacol is more easily handled in intravenous injections than phenol; no inflammation results, if, by error, it passes under the skin or over a vein. It does not cause muscular tremors like phenol does, when injected for the first time. It may be stated, in passing, that the phenol injection did not cause syncope; probably because of the very small dose used. (40 c.c.)

Insofar as guaiacol lowers the internal temperature, even when applied externally, is it not probable that this action will be accentuated when it is in contact with the pulmonary mass? Veterinarian Desjacques noticed a drop from 41 to 38.5 degrees, in Mare 25,733, following an injection of 400 grams (of guaiacol solution), the change taking place in an hour. In similar injections, lowering of the temperature to 38 was noticed, but the temperature in no case fell below 38. If it had, glycerine would have been added to the guaiacol water or guaiacol serum.

With regard to the analgesic action, I believe that this is ex-

erted in intravenous injections, for in all the pneumonia cases treated, coughing was rarely heard.

Guaiacol—10 to 15 grams to 1 liter of water.

2526. Pneumonia—Aug. 18. Nasal discharge red. Tubular breathing, groans. T. 39.7; P. 64; R. 40. 420 grams of guaiacol water.

Aug. 19. T. 39.8; P. 72; R. 40.

Aug. 20. T. 38.6; P. 58; R. 24. In afternoon received 250 grams guaiacol water.

T. 39.7; P. 64; R. 38.

Aug. 21. T. 39.4; P. 68; R. 34. 300 grams guaiacol water.

Aug. 22. T. 38. ; P. 54; R. 30. 200 grams guaiacol water.

Aug. 23. T. 37.5; P. 54; R. 24. Crepitant rales; nasal discharge pale.

Aug. 25. T. 38.2; P. 44; R. 40. A very hot and stormy day.

Aug. 26. T. 37.5; P. 40; R. 16.

Guaiacol in water and in serum.

2529. Pneumonia—Nasal discharge red, groans.

Aug. 25. T. 39.6; P. 56; R. 32. 400 grams of serum containing 15 parts guaiacol per 1000.

Aug. 25. T. 41. ; P. 82; at 2 P. M. 400 grams of guaiacol water, and mustard friction. T. 37.8 three hours later.

Aug. 26. T. 38.3; P. 44; R. 18, in the morning. No treatment.

Aug. 26. T. 39.5; P. 56; R. 26, in the afternoon. 200 grams guaiacol water.

Aug. 27. T. 38.7; P. 66; R. 28; nasal discharge red; groans; received 500 grams of guaiacol serum (15 parts per 1000).

Aug. 27. T. 39.5; P. 72; R. 46, in the afternoon.

Aug. 28. T. 38.3; P. 58; R. 28. 300 grams of guaiacol water and 10 grams of camphorated ether intravenously.

No treatment on the days following

Sept. 6. T. 38.2; P. 56; R. 13. Nasal discharge normal.

Guaiacol and phenol.

2593. Anasarca.—Aug. 29. Morning, edema of the limbs, especially the posterior; petechiae on the Schneiderian membrane. Received 250 grams guaiacol water in the morning; 400 grams in the evening and 8 grams of camphorated ether intravenously.

Aug. 30. Engorgement reaches the elbow and patella. Sanguinous serous transudate from pastern joint. 400 grams guaiacol water in the morning, 600 in the evening.

Aug. 31. Edema less pronounced. Enormous tumefaction of the nose. Received 500 grams phenol water (pure phenol 25 parts per 1000) and 400 grams more in the evening.

Sept. 1. Edema of nose and lips less pronounced rendering petechiae more visible. Received 500 grams phenol water; evening; T. 40.3; 88 feeble pulse. Artificial serum, caffein.—Dead.

Autopsy showed hepatization of the anterior pulmonary lobes and small purulent collections in the left lung.

Phenol water (pure phenol 25 parts per 1000).

2530. Anasarca. Aug. 15. Schneiderian membrane strongly injected; engorgement reaching to the stifle joints and metatarsus. Few drops of bloody transudate from posterior pastern joint. T. 39. Received 440 grams phenol water in the morning and 250 grams in the evening.

Aug. 16. Petechiae more pronounced; 500 grams phenol water in the morning; 800 grams in the evening.

Aug. 17. Petechiae attenuated; 500 grams phenol water.

Aug. 18. 0.05 gram caffein; 25 grams potassium nitrate.

Aug. 19. 0.05 gram caffein; 25 grams potassium nitrate.

Aug. 20. Engorgement disappeared. Schneiderian membrane clean. T. 39. P. 44.

(Several other cases are given in detail. The above are typical. Intravenous medication seems to be more practised abroad than here. For intravenous injection of chloral hydrate, see this *Journal*, May, 1916, p. 268. For intravenous injection of camphor in diseases of the respiratory tract, see this *Journal*, July, 1916, p. 528; both from foreign journals. Recently Meltzer (New York) produced generalized anesthesia by intravenous injection of magnesium sulfate solution. See abstract following.)

BERG.

ANESTHESIA IN HUMAN BEINGS BY INTRAVENOUS INJECTION OF MAGNESIUM SULFATE. C. H. Peck and S. J. Meltzer. *Journal American Medical Association*, Vol. 67, pp. 1131-1133, 1916.—In this preliminary communication we wish to report briefly the course of anesthesia in three operations performed on human beings exclusively under the influence of an intravenous injection of mag-

nesium sulfate. Some of the writers insisted that magnesium exerted only a curare-like action, that is, the salts paralyze the motor nerve endings to such a degree that the animal is incapable of responding to any stimulation; in other words, that the animal which appears to be anesthetized is actually conscious during the operation and feels all the pain inflicted on it, but is incapable of manifesting its sensations on account of the complete paralysis. The operations performed clearly demonstrated that the magnesium solution exerts a genuine central effect which is entirely independent of any peripheral action which may or may not be present. The state of anesthesia produced is actually anesthesia, that is, sensation as well as consciousness is temporarily more or less completely abolished.

In one operation on a 160 pound man, 180 c.c. of a 6% magnesium sulfate solution were infused into the cubital vein in 45 minutes.

BERG.

POISONING WITH STRYCHNINE. By Country Vet. *Veterinary Record*.—A big, strong, cross-bred cow, heavy milker, was suffering with impaction of the rumen, loss of appetite, constipation and difficulty in getting up. A purgative was given, which operated well, and the next day the animal was convalescent. She then received hypodermically 2 grs. of strychnine hydrochloride, which were repeated the next day. It was observed that each time about an hour after the injection, she showed muscular tremors which soon passed off. On the following day her appetite was good, rumination regular, bowels acted well and the animal moved normally. Two more grains of strychnine were administered with the result that violent tetanic spasms took place and she died in ten minutes. The writer says that he has used strychnine in such dose for years and even in larger quantities but has never met with such unpleasant experience before.

LIAUTARD.

UNSUSPECTED DENTAL TROUBLE. Charles A. Squair. *Veterinary Record*.—An aged short horn cow had calved; two days after she could not get up. Yet she was in perfect health, eating and drinking well. She had no milk fever, but could not raise herself. Purged, liniment over the spine and the udder was inflated. In two hours she was up and well. Six weeks after, the writer was called to see her again. She was unable to eat. Anxious for her food,

she took it in her mouth but immediately dropped it. She salivated abundantly. The mouth was carefully examined for an offending molar or a foreign body, but nothing was detected. The molars, the tongue and the pharynx were explored as far as possible and everything was normal. Even a probang was resorted to and pushed into the stomach. Notwithstanding renewed exploration, no explanation was found. A blister was applied over the pharyngeal region without improvement. Finally another exploration of the mouth was decided upon and in placing the gag to keep it open a congested appearance was noticed around an incisor, which was loose. It was pulled out and a teaspoonful of pus escaped. The next tooth was also diseased and extracted. Immediate recovery resulted.

LIAUTARD.

EXPERIMENTS ON THE IMMUNIZATION OF HORSES AGAINST GLANDERS. W. Pfeiler. *Berl. Tier. Woch.* Year 31, No. 45, pp. 532-533, Nov. 11, 1915. *Abst. International Review of the Science and Practice of Agric.*, Year VII, No. 1, January 1916, p. 97.—The object of the writer was to obtain experimental evidence as to the possibility of rendering horses immune to glanders, thereby disproving the majority of German veterinary practitioners. Of the six animals (horses and donkeys) employed, two were inoculated as controls with cultures of the specific bacillus (1/2400 Oese). Both contracted the disease. The remaining four animals were first rendered immune by means of a special vaccine and subsequently injected with the same amount of the culture as had been introduced into the control animals. In no case was the disease produced. The same negative result was obtained on injecting the same four horses with an amount of the culture 2, 4, or 8 times stronger than that used in the first experiment.

The writer concludes that it will be possible to confer immunity against glanders and intends to continue his experiments.

REICHEL.

JOINT ILL IN FOALS. F. W. Schofield. *Second Report on the Investigation Into Joint-Ill in Foals Existing in the Province of Ontario.*—In a previous investigation no specific organism was isolated to which the disease could be ascribed. Several organisms were found that might be the cause. Streptococci were the organisms most frequently isolated from the lesions except in the re-

gions where contagious abortion was prevalent. There the *Bacillus abortivus equinus* was frequently isolated. A vaccine (bacterin) prepared from the organisms most commonly associated with the disease gave very promising results in treatment. The use of a vaccine had reduced the mortality from 66% to 25%. The purpose of the second investigation was to test the use of the vaccine as a prophylactic.

Five veterinarians, in as many different districts, inoculated, as far as possible, all the foals dropped in their respective territories. Only those foals apparently normal were inoculated. When temperature was subnormal or above normal the vaccine was withheld.

The vaccine was a polyvalent mixed infection vaccine. Two kinds of vaccines were employed. One contained *Streptococci*, *Staphylococcus aureus* and *B. coli*. The other contained in addition the bacillus of equine abortion to be used in territories infected with abortion. Original strains of streptococci used came from diseased joints, the *Staphylococcus aureus* from various suppurative lesions, and the *B. coli* from cases of Joint-ill. The virulence of the organisms was assured by the author in preparation for the bacterin. Each cubic centimeter of the bacterin contained streptococci enough to cause a slight local lesion in young guinea pigs; colon bacilli 100 million, staphylococcus aureus 200 million.

The dosage for prophylactic purposes was 1.0 c.c. injected a few hours after birth. One injection was adopted as the dose so as to make the test practical in that it would be inexpensive to the owner. A brief summary of the experiments carried out with the vaccine as a preventive measure shows that in the five districts the

Total number of foals inoculated was.....458

Approximate number of foals not inoculated.642

Total number of foals born1100

Total number of cases of Joint-ill among inoculated foals 14 or 3.0%

Total number of cases among uninoculated foals40 or 6.2%

There was greater evidence of protection in some districts than in others and although the vaccine did not generally confer a very satisfactory immunity the case rate in all districts was greatly reduced. However, the decrease in the case rate was nearly as much in the unprotected district as in the protected. The inoculated foals were on farms where Joint-ill occurred regularly or ir-

regularly for years. The decreased percentage of cases on these farms points to a definite prophylactic value for the vaccine.

The curative dosage is 0.5 c.c., 1.0 c.c., 2.0 c.c., 3.0 c.c., 4.0 c.c. to be given subcutaneously at intervals of five or six days. Age, size and condition of the foal must always be considered. Local reaction, a slight swelling over an area as large as one-half the palm of the hand and passing away in a day or two, and progress of the case also helped to determine subsequent doses. Symptomatic treatment, both surgical and medical, should always be observed. With these precautions the use of the vaccine is more effective. The vaccine should never be used in moribund cases.

Bacteriological findings from blood and synovia of twenty-three cases of Joint-III showed the constant presence of streptococci. There is a predominating hemolytic streptococcus classed as Types II, III, and C. Type II has great pathogenicity for rabbits, less for guinea pigs. Type III has slight pathogenicity for either rabbits or guinea pigs. Type C shows irregular pathogenicity and lack of vitality on culture media. Every case from which type II was isolated proved fatal. Type II was found in milk from three out of four mares whose foals had died of Joint-III and was not found in the milk from seven mares having healthy foals. From this fact ingestion infection is considered to be quite probable.

HAYDEN.

BOVINE ONCHOCERCOSIS IN SOUTH AMERICA. Mr. Piettre. *Bulletin de la Soc. Cent.*—Onchocercosis is frequently observed in cattle killed for the fabrication of preserves. In the Argentine Republic 70% of the animals killed had massive lesions on the cervical ligament, 25% had localizations on the internal face of the great trochanter. In Uruguay, 90% had cervical and 18% had trochanterian lesions.

The parasites are located on both faces of the cervical ligament, between the fifth and first dorsal vertebrae, and also on the trochanter between the tendinous fibres which attach to it. The ligaments of the femoro-patellar ligaments are exceptionally infected: 16 cases out of 1000 bodies.

The parasites are longer than the European. The females sometimes reach 70 centimeters in length. The lesions these worms promote are more serious than those of the French type. They give rise to extensive congestion, formation of large pockets in the

inflamed connective tissue and frequently to encysted purulent collections.

LIAUTARD.

A LESION OF INTESTINAL MYIASIS IN HORSES. Major Veterinarian Velu. *Rec. de Med. Veter.*—The author refers to an animal, in the stomach of which he found an extraordinary number of larvae of oestri, (bots), viz: 1250 in the left sac of the stomach, 80 in the right, 120 in the duodenum. The parasites belonged to different species, *Gastrophilus equi*, *G. veterinarius*, *G. hemorrhoidalis*. The larvae of the *veterinarius* were the only ones that had given rise to serious lesions. After perforation of the duodenal mucosa, they had promoted an irritation of the sub-mucous connective tissue and the formation of tumors, looking somewhat like those of the *Spiroptera megastoma*. Some were as big as a nut and again as large as an egg. They could scarcely be detected in the cavity of the stomach but by examination of the visceral serosa, they could be easily detected. Some of these tumors were hard and others were undergoing softening and suppuration.

LIAUTARD.

ON CERTAIN RELATIONS OF THE LOWER ANIMALS TO HUMAN DISEASE. David John Davis, Chicago, Ill. Read at the Quarter-Centennial of the University of Chicago, Departmental Conference in Pathology, June 6, 1916. Abst. from *Science*, Vol. XLIV, No. 1132, Sept. 8, 1916, pp. 337.—“The study of comparative pathology, it would seem, should occupy a more prominent place in the curricula of our universities and medical schools than it has in the past. When we consider the fundamental character of the studies in this field of pathology—the work of Jenner, of Pasteur, of Koch, of Theobald Smith and especially of a great group of investigators in recent years on cancer and on tropical diseases in man and animals—the truth seems evident that in the study of disease and in its presentation to students, such an important field should not be slighted. Our study of disease in medical and veterinary institutions should be at least as broad and as comparative as is the study of zoology or botany. In order to understand the natural history of many diseases comparative studies are absolutely necessary. It would undoubtedly be advantageous both from a human as well as from a scientific standpoint if our medical schools and hospitals, our veterinary hospitals and even our cat and dog hospitals and

other places for the care of sick animals could all be concentrated in one institution for the broad study of disease. This indeed is now being attempted in certain institutions and no doubt will result in a broader conception of pathology."

Modes of transmission are summarized as follows:—

"1. Infection in man may occur through simple contact with diseased animals.

"II. The infectious agent may be carried mechanically from person to person or from animal to person through food or otherwise by a second animal.

"III. The animal may, through a bite, produce a lesion into which the infectious agent is transferred, as in rabies and especially in the blood-sucking insect diseases.

"IV. The parasite may be transmitted to man through the meat of lower animals used as food.

"V. The infectious agent may be transmitted to man through the secretions of the lower animals.

"VI. The infectious agent may enter one of the lower animals in which it passes through a regular phase or completes a cycle and then, usually through a bite of the animal, is transmitted to man."

HUMAN DISEASES CARRIED

1. By the dog:

Rabies.

Foot-and-mouth disease.

Helminthiasis.

Flukes.

Tapeworms (especially *Taenia echinococcus*)

Infantile splenomegaly (from dogs through fleas).

Trypanosomiasis (*T. gambiense*).

Mange.

Fleas and ticks.

Ringworm.

Favus.

2. By the cow:

Tuberculosis.

Actinomycosis.

Anthrax.

Cowpox.

Tetanus (through vaccine).

Foot-and-mouth disease.

Septic sore throat.

Rabies.

Pus infections.

- Tenia saginata.
- Milk sickness.
- Paratyphoid fever.
- 3. By the horse:
 - Glanders.
 - Rabies.
 - Tetanus.
 - Sporotrichosis.
 - Anaphylaxis.
 - Serum disease.
 - Odor of horses.
- 4. By swine:
 - Trichiniasis.
 - Tuberculosis.
 - Anthrax.
 - Cestodes (especially *T. solium*).
 - Trematodes.
- 5. By sheep:
 - Anthrax.
 - Tuberculosis.
- 6. By goats:
 - Malta fever.
 - Tuberculosis.
- 7. By the antelope:
 - Sleeping sickness.
- 8. By the cat:
 - Rabies.
 - Cestodes.
 - Trematodes.
 - Favus.
 - Ringworm.
- 9. By rats:
 - Rat bite fever.
 - Bubonic plague (through fleas).
 - Trichiniasis (through hog to man).
- 10. By ground squirrels:
 - Bubonic plague.
- 11. By birds:
 - Psittacosis (from parrot).
- 12. By fish:
 - Tape worms.
- 13. By arthropods, chiefly insects:
 - Mosquitoes:
 - Yellow fever.
 - Malaria fever.
 - Dengue fever.
 - Filariasis.

Fleas:

Bubonic plague.
Infantile splenomegaly.

Ticks and mites:

Rocky Mountain fever.
Relapsing fever (African).
Tick fever of Miana.
Japanese flood fever.

Lice:

Typhus fever.
Relapsing fever (*Spirochaeta obermeieri*)

Bed bugs:

Kala azar.

Flies:

Sandfly fever.
Sleeping sickness (tse-tse fly).
Typhoid fever and other infections carried mechanically.

Crustaceans (water flea):

Guinea worm infection (dracunculosis).

Oysters, clams, etc.:

Typhoid fever.

Snails:

Trematode infections (especially bilharziosis).

The control of diseases transmissible from the lower forms of life to man must include a careful consideration of the following points:—

“1. A lower animal may be the only agency in the spread of a disease.

“2. Several different species of lower animals may be concerned in the transmission of the disease.

“3. The lower animal may be a “healthy” carrier. That is, the infectious agent though perhaps highly virulent to man may not cause the animal to become sick.

“4. The lower animal may be a diseased “carrier”; that is, the infectious agent may cause the lower animal to become sick.”

REICHEL.

Dr. S. O'Toole has removed from Agricultural College, N. D. to Atlanta, Ga.

Dr. C. Hays has removed from Burkeville, Va. to 301 Douglas Ave., Kalamazoo, Mich.

Dr. F. F. Meads has removed from Enid to Cherokee, Oklahoma.

ASSOCIATION MEETINGS

AMERICAN VETERINARY MEDICAL ASSOCIATION

REPORT OF THE COMMITTEE ON LEGISLATION

During the term of this committee the consummation of the hopes and labors of many years was realized, and the granting of an officer's rank was bestowed upon our confreres in the U. S. Army after a struggle of many years.

The Army Reorganization Bill became a law and was approved June 3, 1916, and the Act is now officially known as the National Defense Act. It became operative on July 1, 1916; and provides for a Veterinary Corps which shall be a part of the Medical Department of the Army. It also provides for rank, pay and allowances of veterinarians from 2nd Lieutenants up to and including Major, and it further provides for those veterinarians now in the army, giving them active rank as high as Captain and retiring with Major rank. At least that is the way it is supposed to be, and will be decided by the first veterinarian to retire under the new law.

For four years more the U. S. Army in all its branches will be increased one-fifth until the new strength provided for by the Defense Army Act is attained.

The great rush of business and the concentration of our troops on the border have partly prevented the rapid change that was generally expected to take place in the management of veterinary affairs of the Army, but the Medical Corps by which we are to be controlled and directed called for an examination of candidates to be held by the U. S. Civil Service Commission, July 17, 1916. This examination was prepared by the Surgeon General, U. S. Army. A board of Medical Corps officers was convened at Fort Sam Houston, San Antonio, Texas, August 17, 1916. It was composed of Capt. Thomassen, presiding and two medical officers and veterinarians, Griffin and Schwartzkopf.

Successful candidates will be ordered to report before the board for physical examination and if passed will then go into the army veterinary corps as second lieutenant.

The great help given by the members of the A.V.M.A., through their congressmen and senators, is hereby acknowledged. The committee desires to show its appreciation to the invaluable assistance and unchanging loyalty of Chairman James Hay of the House Committee on Military Affairs. Through his efforts and masterly

direction, the veterinary clause of the Army Reorganization Bill was twice passed unanimously by the United States House of Representatives and this committee urgently recommends that proper recognition be given to Chairman Hay of Virginia by this association.

D. E. BUCKINGHAM, Chairman.

REPORT OF THE COMMITTEE ON INTELLIGENCE AND EDUCATION

All the veterinary colleges on the accredited list of this association have been visited by one or two members of the committee with two exceptions. These are the Veterinary Department of the State College of Washington and the Veterinary Division of the Alabama Polytechnic Institute. On account of the expense involved, arrangements were made with Dr. E. T. Baker of Moscow, Idaho, to visit and report upon the Veterinary Department of the Washington State College; and with Dr. H. C. Hutchins, Assistant State Veterinarian of Georgia to visit the Veterinary Division of the Alabama Polytechnic Institute.

There are approximately 20,000 practicing veterinarians in the United States and Canada. During the past year, there were in the veterinary colleges of the United States and Canada 3160 students, of whom 835 were seniors. America is now fairly well supplied with veterinarians. The demand is not for more, but for veterinarians with a more thorough training, not only in strictly professional lines, but in related lines that shall not only make him more efficient as a professional man, but more useful to humanity. The importance of veterinary science to the welfare of the people has never been so evident as at the present time, and realizing this, there is a demand not only within the profession, but also from the public for thoroughly and broadly trained veterinarians.

Most of the veterinary colleges are making an earnest effort to strengthen their courses, by adding new subjects to the curricula, by giving more laboratory work, and by newer and more efficient methods of teaching. The training given veterinary students is better now than it has ever been before, but there is still room for improvement in all, and in some colleges the need is great. As a rule, the greatest weakness is in the smaller private schools. This

is natural as their income does not permit the development that they desire or need.

The committee believes that it is the desire of this association to increase the efficiency of veterinary colleges and the suggestions made are intended to be constructively helpful. Consequently, we shall emphasize only a few points where improvement is most needed.

The greatest defect in veterinary education at present is the lack of a thorough preliminary education upon which to build the professional training. This is necessary, not only that the student shall be able to get the full benefit of the veterinary training, but to meet the demands that come to professional men. At present there is a wide difference of opinion in the different colleges as to what our present entrance requirements mean. Prospective students who fail on the entrance examination at one college go to another and pass the same, or a similar examination. Most of the entrance examination questions are simple, and the grading too liberal.

The Dean of the St. Joseph Veterinary College informed us that all of the seventy applicants for admission passed, and that no students had failed to pass their college examinations the previous session. This variation in entrance requirements is most marked in the private veterinary schools, but the veterinary department of the Kansas State Agricultural College admits students to the veterinary course who have not passed the standard college entrance requirements of fifteen units. Such students are called "specials", and are required to pass the regular class examinations. On the completion of the course, they are granted a "veterinary certificate", instead of a degree. No certificates have yet been granted, but in the class of 1917 there are nine "specials", and in the class of 1918 four. In the freshman class there are twelve specials, one with 13 units one with 10; two with 8; one with 7; one with 5; one with $4\frac{1}{2}$; five with none. Nine students have dropped out. Four of these had no units. The indications are that the other one with no units will go in the near future, as his work is poor.

This association has adopted certain requirements that are susceptible of widely different interpretations. To overcome this difficulty and secure uniform entrance conditions, we recommend that the Committee on Intelligence and Education be authorized to confer with the deans of the private veterinary schools and ar-

range a plan by which entrance examination questions shall be prepared, the examinations held, and the papers graded to meet the requirements of this association.

We also recommend that this association urges the inauguration of short courses for graduate veterinarians that shall enable practitioners to become familiar with the latest and best methods of veterinary science and practice. These courses to be conducted by veterinary colleges or veterinary associations.

We also recommend that the Committee on Intelligence and Education be instructed to correspond with the examining boards of the various states and provinces to urge upon them the importance of thorough examinations conducted so as to place each candidate upon his own responsibility, and that the committee render to state examining boards all the assistance possible to secure uniformity and efficiency. With uniformity of state and provincial examinations, the question of reciprocity between them will be advanced.

We also recommend that the committee prepare an outline schedule for a four-year veterinary course that can be used as a guide by the various colleges.

Your committee wishes to emphasize the importance of establishing what may be called an ethical professional atmosphere in some of the private veterinary schools. This can be done by those in charge and practically at no expense. There is a tendency among some to pose as bold rough veterinary students. A profession is judged very largely by superficial impressions, hence it is very important that the veterinary schools train students in social and ethical lines that are so important in elevating our professional standards.

There is much work to be done for the improvement of veterinary education in America. The veterinarian of the future must have a thorough technical and broadly human training. Calling ours a learned profession does not make it so. We are judged by the public, and we shall only be recognized as a learned profession when we meet the standards set by similar professions.

N. S. Mayo, Chairman; A. S. Cooley; F. Torrance; S. H. Ward; W. B. Mack.

REPORT OF THE LIBRARIAN

Mr. President and Members: The report of the Librarian covers the period from August 1st, 1915, to August 8th, 1916.

The number of copies of the proceedings on hand August 1st, 1915, together with those distributed and those now on hand is shown by the following table:

	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13
On Hand	7	12	82	4	150	136	176	245	38	390
Copies Returned										2
Copies Distributed	1	1	1	1	1	1	2	3	7	15
Books on hand										
August 1, 1916	6	11	81	3	149	135	174	242	31	377

I believe at the meeting last year someone suggested that the editor of the *Journal* take over the office of Librarian. I think that is a very good suggestion, as from now on the editor of the *Journal* has practically all of the work of the Librarian to do. I think it would be a good suggestion for you to act upon.

J. N. FROST, Librarian.

REPORT OF THE INTERNATIONAL COMMISSION IN THE CONTROL OF BOVINE TUBERCULOSIS.

A meeting of this commission was held at Chicago, December 1, 1915, in connection with the United States Live Stock Sanitary Association. Careful consideration was given to available information concerning the newer tuberculin tests. It was the unanimous conclusion of the commission at this meeting that public statement endorsing either of the newer tests or the simultaneous (thermal and intradermal) was at that time inadvisable, because available information was inconclusive and because of official difficulties that would arise in public work from premature statement.

A committee of three, Torrance, Mohler and Moore was appointed to compile data and make a critical study of available evidence as to the reliability of the newer tuberculin tests.

Another meeting of this commission was held in Detroit on August 23, 1916. The special committee previously mentioned reported a considerable amount of data concerning the newer tuberculin tests which appeared to show that the intradermal test

has no advantage in accuracy over the usual thermal test under ordinary conditions, but may have important advantages under special conditions. A limited amount of data was reported on the complement fixation test which showed an average accuracy of 81.6 per cent.

Careful consideration was given to the future work of the commission. It was the unanimous opinion that its future work should be that of correlating more closely the technical knowledge of this disease with the practical work of control.

This commission feels that there are possibilities of important constructive action along the line of working out a practical scheme of co-operation between federal, state and other authorities in following to the point of origin tuberculosis infection discovered by official inspection of meat animals before or after slaughter. This commission also recognizes the possibility of important service in furthering such lines of work as official recognition and registration of tuberculosis-free herds of pure bred cattle.

This commission deems it important that in this work and in kindred lines of effort, the American Veterinary Medical Association should take a prominent part.

While the commission feels that there is at present but little benefit to be derived from its further study of bovine tuberculosis from the strictly technical or professional point of view, its members are convinced that much good may result from an endeavor to correlate the practical with the scientific aspects of the problem.

The commission would therefore suggest that the association should make such provision as may be necessary to undertake this new and promising line of work either by continuing the commission as at present constituted, or with such changes in the personnel as may be considered advisable.

J. G. RUTHERFORD, Chairman.

M. H. REYNOLDS, Secretary.

REPORT OF THE JOURNAL COMMITTEE

In accordance with the action taken by the American Veterinary Medical Association at its meeting in Oakland, California, to establish a *Journal* for the association, the sub-committee on *Journal*, carrying out the arrangements already made with Dr. Ellis by the Committee on Journal, Doctors C. J. Marshall, R. P.

Lyman and Dr. A. Eichhorn, met with Dr. Ellis and his attorney F. L. Mayham, at Dr. Ellis's home September 25, 1915. Dr. P. A. Fish was present by invitation. Arrangements were made for the taking over of the *American Veterinary Review* as the official Journal of the American Veterinary Medical Association, for the sum of \$2500.00 Dr. Fish was appointed editor. The *Review* became the property of the association, October 1, 1915. The October number was prepared and published by Dr. Ellis at New York City. The subsequent numbers have been prepared by Dr. Fish at Ithaca, N. Y.

The expenses of the *Journal* have been paid from its earnings outside of the association so far as possible. When these have not sufficed the membership subscriptions have been drawn upon through the treasurer. Approximately one-third or slightly less of the circulation is among non-members. The postal regulations require that members must be *bona fide* subscribers and that a portion of the dues must be used for the payment of the subscription. On this basis, there should be a fund for the *Journal* in the hands of the treasurer, which can be drawn upon as needed.

The following is a statement of the receipts and expenditures of the *Journal* for ten months ending July 31, 1916.

Receipts and expenditures. 10 months, ending July 31, 1916:

RECEIPTS

Renewals and Subscriptions	\$2110.02
Advertising	2327.76
Miscellaneous	116.89
Binders	23.00
Sundries (unaccounted for)95
Journal Fund from Treasurer	1860.34
	<hr/>
	\$6438.96

EXPENDITURES

Printing Journal to Aug.	\$4363.60
Miscellaneous for Journal	194.48
Postage	455.88
Office and Assistance	427.15
Miscellaneous	171.73
Miscellaneous paid by Treasurer	15.56
	<hr/>
	\$5628.40
Excess of receipts	810.56
	<hr/>
	\$6438.96

There are 1726 members whose dues have been paid. This means a fund of \$3452.00 for the *Journal* from subscriptions of the members. In addition to this should be considered the subscriptions from applicants for membership of which, there are 421. This means a further addition of \$842.00 to the *Journal* fund. From the members and applicants' subscriptions, there should be a total of \$4294.00 to the credit of the *Journal*. From this there should be deducted the \$1860.34 already received from the treasurer, leaving a balance of \$2433.66. There should be a still further reduction for the items of salary and the \$150.00 paid Dr. Ellis for members' copies of the October number of the *Journal*. This would reduce the amount to \$1283.66.

While the previous itemized statement of receipts and expenditures refers only to the *Journal* office, there should be considered, from the association's standpoint, the item of \$150.00 paid by the treasurer to Dr. Ellis for the additional copies of the October 1915 number. This, with the editor's salary, paid by the treasurer, would bring the total of the expenditures for the ten months to \$6778.40. While we cannot assume the accuracy of the figures outside of our own office, our records and general information indicate that the following general statement would be conservative and approximately correct:

JOURNAL OFFICE

Receipts, 10 months	\$4578.62	Expenditures, 10 months....	\$5628.40
Receipts from Treasurer....	1860.34	Paid by Treasurer to Dr. Ellis	
Journal Fund still with Treas.		for Oct. 1915 No.....	150.00
(paid by members)	1591.66	Salary paid by Treasurer....	1000.00
Journal Fund still with Treas.			
(applicants)	842.00		\$6778.40
		*Excess of Receipts	2094.22
	\$8872.62		\$8872.62

*Made up of balance of \$810.56 in Journal office Aug. 1, 1916, and \$1283.66 estimated balance with treasurer.

Considered in the expense to the association should be reckoned the price of \$2500.00 paid to Dr. Ellis for the *American Veterinary Review*. At the close of the year ending September 30, it would appear that there will be a balance which might be applied upon the original cost of the *Review*. In this event, it would appear

that the *Journal* has paid its own expenses, the salary of the editor and a portion of the original cost of the *Review*.

The amount paid for the *Review* is materially less than that paid, of late years, for the publication of the former proceedings which brought no direct financial return to the association.

During the year there were 266 subscribers who, up to date, have failed to renew their subscriptions. To offset this, there have been 159 new subscribers, not members of the association, and 421 new applicants for membership in the association.

The average circulation of the *Journal* for ten months has been 2770. The mailing list for August was 2936 and on August 12, reached 3,003.

It is hoped that the *Journal* has been a factor in bringing new members into the association and that it may grow in usefulness to the profession at large. It is also hoped that it may grow in usefulness in the advertising field; that advertisers will appreciate an impartial and uniform rate for space and that there may be a spirit of cooperation between advertisers and members in that the advertisers are contributing to the support of the association and members by patronizing them, are also contributing to a certain extent to this end. Members may cooperate by contributing articles to the *Journal*, by helping to increase the membership, subscribers and advertisers and build the *Journal* into one of the strongest veterinary periodicals in the world.

RECOMMENDATIONS

It is recommended that the association subscribe for the *Journal* at the regular membership rate for the honorary members.

That the members of the Honor Roll shall pay the subscription price of the *Journal* if they continue to receive it.

That the business proceedings of the association together with the constitution and list of members be printed in a supplementary number of the *Journal*.

That when an article is accepted for publication in the *Journal*, the author be notified and 50 reprints will be furnished free of charge, should he express a desire to have them. Additional copies at the regular rate.

That the editor be allowed \$75.00 a month for assistance and office expenses.

The members are to be congratulated upon the success of the operation of the *Journal* and urged to do all in their power to promote its welfare.

F. TORRANCE, Chairman.

REPORT OF THE COMMITTEE ON NECROLOGY

During the past year the following named members have been taken from us. We have, in preparing this list, endeavored to get every one in. Sometimes we have not been able to get the names until after the convention. We have, from the publishers of the various journals, endeavored to get in touch with the names that they knew of, and I trust that the list is complete, and that no one has been omitted. After reading this list, if any person should be familiar with the death of others, we desire to know about it.

The following is the list:

Dr. Francis Abele, Jr., 18 Spear St., Quincy, Mass. He graduated from the Ontario Veterinary College in 1893; admitted to membership in this association in 1900; and died March 26, 1916.

Dr. Fred Barclay Carter, 21 W. Fornance Street, Norristown, Pennsylvania. He graduated from the University of Pennsylvania in 1912; was admitted as a member of this association the same year; and was killed in the spring of 1916 in an automobile accident.

Dr. J. B. Desmond, 77 Currie Street, Adelaide, South Australia; died during the year. He was a graduate of the Melbourne Veterinary College in the year 1887; was admitted into this association in 1903. Dr. Desmond was quite a familiar character to this association, at least his writings on this side of the water are. For a number of years he contributed articles to the *American Veterinary Review*; I think also to Dr. Campbell's journal and others. He was a member of this association, although he lived quite a distance from us, and he was quite interested in the work going on in this part of the country.

Dr. B. G. Dill, of Charleston, South Carolina was a graduate of the Kansas City Veterinary College in the year 1908; was admitted to membership in this association in 1910 and died on the 17th of September, 1915.

Dr. Roy N. Drake of Reno, Nevada; a graduate of the Ohio Veterinary College in 1896; admitted to membership in this association in 1909; died April 11, 1916.

Dr. John J. Gallagher of Lovelock, Nevada, was a graduate of the New York State Veterinary College in 1904; was admitted to membership in this association in 1915; and died on July 22, 1916.

Dr. W. C. Holden, of Delphos, Ohio, graduated from the New York College of Veterinary Surgeons in 1880; was admitted to membership in 1902; and died on the 16th day of April, 1916.

Dr. D. Arthur Hughes, of Chicago, Illinois, was a graduate of the New York State Veterinary College in 1903; was admitted to membership in this association in 1904; and died on the 15th day of February, 1916. I believe that it is pretty generally conceded that in Dr. Hughes we lost one of our very prominent members. He was a gentleman of rare literary attainments, an ardent worker for the uplift of the veterinary science, and I presume that I am safe in stating that he was one of the most active men in the association, and in the general uplift of the veterinary profession in this country.

Dr. David McKibbin, Jr., of Philadelphia, Pa.; a graduate of the University of Pennsylvania in 1906; admitted to membership in this association in 1910. I have not the date of his death here, but he died in California. I received from Dr. Klein a copy of a San Francisco paper, and from that I inferred that Dr. McKibbin was one of the very prominent men on the Pacific Coast, and a gentleman of very wide experience. He had traveled a great deal in foreign lands; had been to China; and had been investigating diseases of cattle. He had also been to the Philippine Islands and had made a great name for himself. A great deal more about the achievements of this good doctor could be mentioned, but I have not the copy here.

Dr. W. H. McKinney, 308 Bumbel Building, Kansas City, Missouri; graduate of the Chicago Veterinary College; admitted to membership in 1891; died on the 23rd day of February, 1914. He should have been included in last year's report, but through some oversight was omitted.

Dr. W. F. Meyers, of Fort Wayne, Indiana, was a graduate of the Chicago Veterinary College in 1889; was admitted to member-

ship in this association in 1900; and died on the 17th day of January, 1916.

Dr. Harry W. Rike, 735 Lincen Avenue, Burlingame, California, was a graduate of the Ontario Veterinary College in 1889; was admitted to membership in 1909; and died on the 6th day of April, 1916.

Dr. U. S. Springer, of Grand Rapids, Mich. We have been unable to ascertain the date of his death. Mail was returned marked deceased.

Dr. F. D. Weisse, 46 W. 20th Street, New York City, was a graduate of the New York Veterinary College, and was admitted to membership in 1871. He was an honorary member of this association or rather on the honor roll. He was once upon a time a member of the faculty of the Veterinary College of New York. The doctor died in 1915. This is another case that was overlooked at the last meeting.

Dr. John Scott, of Peoria, Illinois. I have no data further than that.

Dr. Theodore Kitt of Bavaria, Germany. I presume we are all more or less familiar with the great work that this man has done. He was perhaps one of the foremost pathologists of Europe. I have no dates on the case, although I can say that Dr. Kitt was an honorary member of this association.

H. JENSEN, Chairman.

SECRETARY'S OFFICE A.V.M.A.

Resignations due to the increase of the annual dues to five dollars are surprisingly few. In the November issue this announcement read "registrations" instead of "resignations".

There will be a meeting of the Executive Board at the Secretary's office on the evening of December 5th, 1916 to consider some questions that have arisen under the new Constitution and By-Laws. It was thought advisable to convene a session at this time because a quorum will undoubtedly congregate in Chicago to attend the annual meeting of the United States Live Stock Sanitary Association.

In order to complete the working organization of the association at an early date the Resident State Secretaries appointed by

President Cotton are again requested to accept their respective appointments as soon as possible.

The following prominent veterinarians have recently visited the Secretary's office.—Robt. Prior, North Yakima, Wash.; J. H. Crawford, Harvard, Ill.; John H. Blattenberg, Lima, Ohio; J. A. Anderson, Seward, Neb.; Adolph Eichhorn, Washington, D. C.; E. B. Ackerman, Brooklyn, N. Y.; O. E. Dyson, Springfield, Ill.; A. C. Worms, Chicago, Ill.; A. C. Tillman, Earlville, Ill.; and Thos. H. Ferguson, Lake Geneva, Wis.

The president has been requested to appoint tellers to count the ballots for the nomination of candidates for the several offices on the Executive Board. While the Constitution leaves this matter solely to the Secretary, the importance of this particular election which includes the whole Board, places a responsibility upon the shoulders of one officer that is great enough for a whole committee of tellers to carry.

As the day for closing the nominations draws near (Nov. 27th) it is becoming apparent that only a small vote will be cast. Less than 25 per cent of the electors have voted to date (November 11th). The cause seems to be due to the fact that this sudden change of the Constitution is little understood and the importance of these offices is under-estimated by a majority of the members.

THE SOUTHEASTERN STATES VETERINARY MEDICAL ASSOCIATION
MEETING, ATLANTA, GA., DECEMBER 27, AND 28, 1916.

The nucleus of this new organization was formed at Detroit during the recent A.V.M.A. meeting.

The need of such an organization is apparent when it is realized that a very large per cent of the veterinary practitioners of the section included will seldom have opportunity to attend meetings of the A.V.M.A. It should, however, be one of the numerous feeders of the latter organization. Again, it is felt that such an organization will give opportunity to develop much latent force in many of our better but more reserved practitioners. It will serve to bring the veterinarians of the section together and to get acquainted and it is hoped it will tend to popularize and elevate the profession in the eyes of their clients and public.

The size of the territory included in this organization is to be such that all veterinarians within it can easily attend by holding the meetings near the center of it. It has been thought best to hold the meetings in the most central state and ask those to join which bordered on this state or are no further off than bordering states. A glance at the map will show the Southeastern territory logically to include Georgia as the center surrounded by North and South Carolina, Florida, Alabama, and Tennessee with Mississippi being no further away than parts of Tennessee. Others wishing to join, however, will not be barred.

Temporary officers elected at the Detroit meeting were Drs. Tait Butler, Chairman; G. A. Roberts, General Secretary and Resident Secretary for North Carolina; C. A. Cary, Alabama; Dr. W. H. Burson, Georgia; Dr. F. P. Caughman, South Carolina; and Dr. F. W. Porter, Florida.

A splendid program for the Atlanta meeting is being arranged, at which time also the permanent organization will be formed.

All qualified veterinarians of the Southeastern States are urged to attend and support their new organization.

G. A. ROBERTS, Temporary Secretary.

OKLAHOMA STATE VETERINARY MEDICAL ASSOCIATION

The first meeting of the O.S.V.M.A. was held at Oklahoma City, October 23, 24, 25, 1916. The association was assisted in the program by several of the leading veterinarians of the United States, which gave the members a chance to learn of the progress made in the control of infectious diseases.

One of the things which the association regretted was that the president, Dr. R. F. Eagle was leaving the state, having received a promotion and will now be located in Chicago as assistant superintendent of all of Wilson & Co. Packing Establishments. To fill the vacancy made by the withdrawal of Dr. Eagle, Dr. J. S. Grove, inspector in charge of the U.S.B.A.I., was chosen as president.

This was the initial meeting of the O.S.V.M.A., and thanks to the assistance of those veterinarians who came to assist us in getting it started right, we have the prospect of becoming one of the best state veterinary associations in the United States.

The program opened with an address of welcome by Mayor

Overholser of Oklahoma City, to which an able response was made by Dr. J. A. Kiernan of Washington, D. C. Following the president's address papers were given as follows:

"The Control of Animal Diseases from the Viewpoint of a Layman"—John Fields, Editor Oklahoma Farmer; "Live Stock Sanitary Control Work from the Viewpoint of a Financier"—T. P. Martin, Jr., President Oklahoma Stock Yards National Bank; Address—F. M. Gault, President Oklahoma State Board of Agriculture; "Legislation Necessary to the Proper Control and Eradication of Infectious Animal Diseases"—N. S. Mayo.

"The Veterinarian's Part in Live Stock Sanitary Control Work"—D. F. Luckey.

"Cooperation of Practicing Veterinarians with the U. S. Bureau in the Control and Eradication of Contagious Diseases in Live Stock"—J. A. Kiernan.

"A Résumé of Various State Live Stock Sanitary Regulations Found to be Effective in Control of Hog Cholera"—Discussed by Non-resident Veterinarians.

Night Session with Oklahoma Co. Medical Society. Address—J. W. Duke, President Oklahoma State Board of Health; "Infant Mortality a Result of Contaminated Milk Supply"—M. E. Gilmore; Standardizing a Municipal Milk Supply"—Lewis Crabb; "Meat Inspection in its Relation to Public Health"—J. S. Grove; Hemorrhagic Septicemia"—W. P. Schuler; "Bovine Tuberculosis and Proper methods for its Control"—D. F. Luckey; "The Prevalence of Cattle Abortion and its Economic Relation to the Live Stock Industry"—A. T. Kinsley; "Relative Merits of Intradermal, Ocular and Subcutaneous Tuberculin Tests"—Lewis Crabb; "Glanders and its Control"—C. C. Hooker; "Diseases Common to the Canine"—J. E. Nance; "The Value of Biologics as Therapeutic Agents"—A. T. Kinsley; "Requisites Necessary to Successful Veterinary Surgery"—R. C. Moore; "The Newer Therapeutic Agents"—H. Jensen; "Reports of Cases"—Drs. Anthony, R. C. Smith, C. R. Walters, Geo. Pugh; Display of Pathological Specimens, U. S. Bureau of Animal Industry; "Technique of Swine Vaccination", Hospital of Dr. C. C. Hooker—Drs. D. W. Gurber and J. G. Eagle; Clinic at Hospital of Dr. C. C. Hooker—Dr. R. C. Moore in charge.

The following men in addition to those on the program were present and entered into the discussions: Dr. G. Ditewig, Washing-

ton, D. C.; Dr. A. O. Lundell, Fort Worth, Tex.; and Dr. John Eagle of Kansas City, Mo.

About twenty new members were taken into the association at this meeting.

R. C. SMITH, Secretary.

NEW YORK CITY VETERINARY MEDICAL ASSOCIATION—JUNE MEETING

The regular monthly meeting of the N. Y. City Veterinary Medical Association was called to order by the president, Dr. Geo. Goubeaud, at 9 P. M. The minutes of the May meeting were read and approved.

The committee on legislation reported that they had written the Governor and asked for a hearing on the Bill before he signed it. Reported that the Bill had been signed.

The Prosecuting Committee reported progress.

The Judiciary Committee also reported progress.

The Prosecuting Committee, on request, amended their report.

Dr. Cochran said that \$640 had been subscribed to the prosecuting fund.

Dr. Gannett stated that eight arrests had been made. All had pleaded guilty and were held for Special Sessions. More money is needed to carry on the work.

This report was duly accepted.

Dr. J. G. Wills, Chief Veterinarian, Department of Agriculture, State of New York, then presented an able and instructive paper entitled "State Veterinary Police Work With Special Reference to Laws Governing the Control of Infectious Diseases."

Dr. Wills spoke of the countries and states which have been lax in taking up veterinary control work.

The authority of a state is confined to its own borders. Federal control is under the Bureau of Animal Industry.

Veterinary control work affects not only the health of the people but the economic conditions as well.

Said that a state meat inspection service would be of great value and it is to be regretted that New York State has no such service.

Formerly the control of animal diseases was vested in the State Health Department but is now handled by the Veterinary Bureau of the Department of Agriculture.

The co-operation of stock owners is a great help especially in a sudden outbreak of some disease.

The head of the department should be allowed a certain amount of laxity to meet special cases.

A meat inspection law would aid in the detection of contagious diseases. The present Agricultural Law is in certain ways unsatisfactory. There should be laws regulating the use of biologic products especially the virus of hog cholera.

Also mentioned the proposed registration of herds free from tuberculosis.

It is difficult to obtain sufficient funds to reimburse owners whose stock has been destroyed under the provisions of the agricultural law and this may make it necessary to curtail the work.

Great good may be done by the profession at large in the line of Veterinary Police work and regrets that there is not better organization along these lines.

Our legislators as a rule are not conversant with conditions and it is therefore necessary to educate them before favorable and intelligent action can be had.

Mentioned the movement to replace the Chief of the B. A. I. with a layman which would have proved disastrous to the interests of the country.

Dr. W. Reid Blair, eulogized Dr. Wills' paper and in part said that it is essential that the State Department have the support of the owner and veterinarian to obtain the best results.

The education of the legislators has to be repeated often as changes are frequent.

Dr. H. D. Gill stated that he considered this paper the most important that had been presented in some time and that also the legislators should be educated, along certain lines, by the veterinarians.

Dr. E. B. Ackerman said he was highly interested in Dr. Wills' paper and regrets that there is no state meat inspection law.

Dr. T. E. Smith of Jersey City said that Dr. Wills had covered the subject very thoroughly and that administrative officers should have the support of the practicing veterinarians. The practitioner should prepare the way and educate the owner to co-operate.

Mentioned the glander quarantine law as being of great benefit to the State of New Jersey.

Dr. Goubeaud, in speaking of Dr. Wills' paper, advocated a plan to establish a fund to reimburse owners of animals condemned by the State Department of Agriculture, viz: a tax of one dollar per head on horses, fifty cents on cattle and twenty-five cents on sheep and hogs. Advocated the establishment of a Veterinary Bureau with county veterinarian in each county.

Dr. Chase said that he was deeply interested in this subject and commended the work of the state veterinarians. There are too few state veterinarians in certain localities and in support of this statement cited a case in which hogs had been brought to Long Island from one of the best up-state hog farms with the result that hog cholera was introduced to a previously un-infected district.

All stock before being moved should have veterinary inspection and there should also be a State Law requiring the inspection of all animals killed for food purposes. In the rural districts there is no meat inspection.

Also mentioned tuberculin testing, stating that there are a million and a half of cattle in the state to be tuberculin tested, and recommended that a competent person under the supervision of the qualified veterinarian be allowed to take temperatures as in most instances it is difficult or impossible to obtain the assistance of qualified men.

Dr. Gill said in answer to this that it was inconsistent to have a layman do part of the test and the state will not allow it.

Dr. Wills, in closing the discussion, also said that he would not ask the Commissioner of Agriculture to change the rules regulating the test as official and accepted tests must be made in conformity with the rules of the department.

Letters from Dr. Hoskins were read regarding the Army Bill and the Salmon Memorial Fund. Copies of Senator Hughes' speech in support of the Army Bill were distributed to the members.

The secretary was instructed to write the Hon. Wm. Hughes and express the appreciation of the association for his efforts in behalf of the Army Bill.

The same action was directed in the case of Hon. Julius Kahn of the House Military Committee.

Dr. Slawson made an unqualified denial of any connection with the bribery charges recently made by the Dept. of Health. He tendered his resignation and was suspended May 1st, 1916.

Dr. Smith announced the Alumni dinner to be held at the Hotel Astor, June 15, 1916.

A vote of thanks was tendered Dr. Wills for his valuable paper.

The following delegates were appointed to represent this association to the A.V.M.A.: Dr. D. W. Cochran, Dr. E. B. Ackerman, and Dr. W. Reid Blair. To the N. Y. State V.M.S.: Drs. R. W. Gannett, H. D. Gill and Cassius Way.

The program committee announced that at the next meeting, in October, a surgical clinic would be held and it was expected that Prof. Adams of the U. of P. would be present. No further business appearing the meeting adjourned.

ROBT. S. MACKELLAR, V.S., Secretary.

UNITED STATES LIVE STOCK SANITARY ASSOCIATION
TWENTIETH ANNUAL MEETING

This meeting will be held at Hotel La Salle, Chicago, December 5, 6, and 7, 1916.

This association includes leading Federal and State Live Stock Officials, farmers, stockmen and many persons interested in various lines of Live Stock work in this country.

The program for this meeting combines a variety of topics of the greatest interest and importance to everyone concerned in the prosperity of the Animal Industry of the United States.

The regular sessions of the meeting will be open to the public. Farmers and stockmen are especially invited to attend.

Anyone desiring additional particulars regarding the meeting or program should write the Secretary, John J. Ferguson, Union Stock Yards, Chicago.

CHICAGO VETERINARY SOCIETY

At the annual meeting of the Chicago Veterinary Society, October 10, the following officers were elected: Dr. John B. Jaffray, president; Dr. George Frost, first vice-president; Dr. C. A. Zell, second vice-president; Dr. James Robertson, treasurer; Dr. A. A. Leibold, secretary. Board of Censors: Dr. A. C. Worms, chairman; Dr. L. A. Merillat; Dr. E. L. Quitman.

A very successful meeting was held November 14, the annual banquet being given at this date, the attendance numbering twenty-seven.

A. A. LEIBOLD, Secretary.

TENNESSEE VETERINARY MEDICAL ASSOCIATION

As retiring secretary of our association, I wish to make a report of our meeting which was held at Humboldt, Tenn., November 8th and 9th.

We had the greatest meeting in the history of the association, taking in twenty new members, many valuable papers and an entire day clinic. A theatre party and a dinner was given the members by the local veterinarians.

Our next meeting will be at Columbia, Tenn., in the early part of November.

Officers elected and appointed as follows:—

OFFICERS, 1917:—President, Dr. F. W. Morgan, Chattanooga, Tenn.; Vice-President, Dr. J. M. Jones, Lewisburg, Tenn.; Second Vice-President, Dr. G. W. Shaw, Knoxville, Tenn.; Secretary, Dr. F. R. Youree, Lebanon, Tenn.; Treasurer, Dr. A. C. Topmiller, Murfreesboro, Tenn.

COMMITTEES:—Executive Committee, J. H. McMahon, J. W. Scheibler, S. H. Woods. Legislative Committee, M. Jacob, F. R. Youree, Geo. R. White. Finance Committee, Wm. Murray, L. D. Nowell, A. J. Brown. Resolutions Committee, C. D. White, G. A. Metcalf, C. E. Kord. Ethics Committee, Geo. R. White, G. B. Giltner, A. C. Topmiller.

The following program was given.

Hog Cholera and its Technique as a Standard Adopted by the State	C. Dillon White
The Production of Serums, Distribution and Results....	
.....	G. B. Blackman
The Relation between the Division of Extensions and the Veterinary Profession	C. D. Lowe
Transmissible Diseases Among Live Stock in Tennessee...	
.....	M. Jacob
The Value of Meat and Milk Inspection.....	J. A. Austin
Castration of Cryptorchids and Restraint.....	G. R. White

Infectious Stomatitis in the DogJ. W. Scheibler
Case ReportR. J. Landis

The second day was devoted to the clinic. Among the operators were: M. Jacob, G. R. White, G. B. Giltner, W. M. Bell, J. W. Scheibler, J. H. McMahon, C. Dillon White, G. B. Blackman, C. D. Lowe, F. R. Youree.

F. W. MORGAN, Secretary.

COMMUNICATIONS

The Journal of the American Veterinary Medical Ass'n,
Ithaca, N. Y.:

The Veterinary Division of the North Carolina Agricultural College will offer a One Week's Course for Graduate Veterinarians January 8-13, 1917.

The success of the course last year was such as to warrant giving it again. It will probably become an annual event.

The college force is expected to be supplemented by Dr. R. C. Moore, President of the St. Joseph Veterinary College; Dr. N. S. Mayo, of the Abbott Laboratories; and Dr. T. B. Carroll, practitioner and horse shoer, of Wilmington, N. C.

Yours very truly, G. A. ROBERTS.

CORRECTION: In my paper on "The Bull as a Disseminator of Contagious Abortion", published in the November number of the *Journal of the A.V.M.A.*, page 146, in my reference to Dr. W. L. Williams' article, I inadvertently connected a paragraph on cohabitation as a factor in the transmission of abortion infection with one just preceding it relative to the bull as a disseminator of the disease.

F. B. HADLEY.

NECROLOGY

Dr. John A. Boyd, Mason City, Nebraska.

MISCELLANEOUS

NOTE:—For the sake of accuracy and the convenience of the Editor's office, it is requested that each subscriber scrutinize carefully the name and address upon the wrapper of his *Journal* and report any inaccuracy at once to this office.

Dr. Frank Bowne has removed from Hazleton, Ind. to Paris Crossing, Ind.

Dr. Alexander Plummer has removed to 1215 West 37th St., Los Angeles, Cal.

Dr. R. S. Whitney is working with the Department of Health at Albany, N. Y.

Dr. Earl S. Pickup has removed from Cattaraugus, N. Y. to Union City, Pa.

Dr. H. L. Tate has removed from Portland, Ore. to Stock Yards Sta., Sioux City, Ia.

Dr. H. S. Gilliland of Marietta, Pa. has removed his office to the Widener Building, Philadelphia, Pa.

Dr. G. S. Weaver has removed from Olivia, Minn. to Mitchell, South Dakota.

Dr. G. A. Hawthorne has removed from Blanchard, Ia. to 1322 Tracy St., Kansas City, Mo.

Dr. R. E. Christopher has removed from LaCrosse, Wis. to Mason City, Ia.

Dr. E. R. Rodgers, for eighteen years a practicing veterinarian at St. Joseph, Mich., has retired from active practice. Dr. E. C. Goodrich, who has been associated with him the last two years, will continue the practice.

The meeting of the Central New York Veterinary Medical Association was held at Syracuse, November 28.

Mr. Louis R. Curtis, formerly of St. Luke's Hospital, Chicago, has been elected president of the Frank S. Betz Company of Hammond, Ind. He has had wide experience among hospitals and medical men. Mr. Frank S. Betz will continue as chairman of the board of directors. Other interests are given as reasons for his retiring as active head of the company.

The Western New York Veterinary Medical Association will hold its next meeting December 15, 2:30 P. M. at the Erie Co. S. P. C. A. Building, 121-123 West Tupper St., Buffalo, N. Y.

The next meeting of the Connecticut Veterinary Medical Association will be held at the Hotel Garde, Hartford, Conn., Feb. 6, 1917.

James Gordon Bennett of New York City has presented a sum for the benefit of the New York State Veterinary College at Ithaca, N. Y., the income of which is to be used as a prize for the best work done in veterinary anesthesia.

A VETERINARY FIELD FOR CHRISTIAN SCIENCE.—“The poor little kittens were all born blind, but I prayed and I read Science and Health, and after ten days every little kitten got his eye-sight just as good as anybody’s.—Glory be to Mother Mary Baker Glover Patterson Eddy.” (Quoted by Dr. E. C. Hill in *N. Y. Medical Journal*).

PRACTITIONERS’ SHORT COURSE IN VETERINARY MEDICINE. University Farm, Davis, Cal., Dec. 27–30, inclusive. The following schedule has been approved by a committee of the California State Veterinary Medical Association, in cooperation with the Division of Veterinary Science of the University of California:

- Wednesday, December 27.* 1:15 to 1:30. Address by an officer of the University.
1:30–1:45. Address by a California Practitioner.
1:45–3:30. Lecture and demonstration in judging farm animals. A rapid survey of breeds and types of the various species of farm animals. Professor Gordon True and assistants.
3:30–5:30. Lecture: Abortion in Cattle. Dr. W. L. Williams.
7:30–8:15. Illustrated lecture: Sterility in Cattle. Dr. W. L. Williams.
8:15. The Bacteriology and Pathology of Infectious Abortion. Dr. K. F. Meyer.

Thursday, December 28. 9:00–10:30. Lecture and laboratory demonstration on biological phenomena as related to immunity and infectious abortion, including methods of obtaining pure cultures, agglutination, complement fixation and anaphylaxis. Dr. Jacob Traum and assistants.

- 10:30—12:00. Lecture and demonstration: Recent Developments in the Prophylaxis of Anthrax, Blackleg, and Septicemia Hemorrhagica. (Speaker to be announced).
- 1:30—2:45. Lecture and demonstration in judging dairy cattle. Professor True.
- 2:45—4:30. Clinical demonstration upon handling of Sterility in Cattle. Dr. W. L. Williams.
- 4:30—5:30. Lecture and demonstration on Diseases of Poultry. Dr. J. R. Beach.
- 7:30—8:15. Paper on the occurrence and importance of abortion and sterility in California cattle. Dr. C. M. Haring.
- 8:15. Lecture and demonstration: The Prophylaxis and Therapeutics of Calf Scours and Pneumonia. Dr. Williams.
- Friday, December 29.* 9:00—10:30. Lecture and demonstration of chemical and bacteriological tests of interest to veterinarians as used in public health work. Drs. Haring, Roadhouse and Traum.
- 10:30—12:00. Lecture and demonstration on hog cholera. Dr. B. J. Cady.
- 1:30—4:00. Lecture and clinical demonstration of surgical technic illustrating recent developments in surgery with operations or anaesthetized animals. (Surgeon to be announced).
- 4:00—5:30. Demonstration of a thorough post-mortem on a large animal. Dr. K. F. Meyer.
- 7:30. Smoker, with program consisting of short talks on how the veterinarian can advance his interests in the future.
- Saturday, December 30.* 9:00—10:00. Lecture: Suggestions on the Treatment of Diseases of the Digestive Tract in Cattle. (Speaker to be announced).
- 10:00—12:00. The Specific and Nonspecific Treatment of Infectious Diseases, illustrated by demonstrations of biological phenomena. Dr. K. F. Meyer.
- 1:30—2:30. Lecture and demonstration on parasites of animals. Prof. W. B. Herms.
- 2:30—5:00. Clinic: (The subjects treated will depend on the material available.) Special features already arranged include demonstrations of intradermal, intrapalpebral and ophthalmic tests on reacting cattle, cattle surgery and the operation for the relief of roaring in horses.

Accommodations are ample and expenses moderate. Considerable interest has been manifested and indications point toward a good attendance from California and adjacent states.

ENROLLMENT OF STALLIONS IN NEW YORK STATE. The veterinary bureau of the Department of Agriculture has sent out blanks for the Enrollment of Stallions in New York State. The new law provides for the examination of all stallions offered for service, by a veterinarian who must certify to the Commissioner of Agriculture concerning the animals' soundness and freedom from infectious incurable diseases. It is required that the owners shall obtain a certificate of the condition of soundness of their stallions, signed by a veterinarian who is approved by the Department of Agriculture. The veterinarian must take an oath before a notary, attesting the certificate. The owner of a stallion must post the certificate of enrollment in a conspicuous place in his stable. Circulars advertising stallions must copy the certificate issued by the Department of Agriculture. The charge for enrollment is \$3, for renewal \$1, and for transfer 50 cents. After Jan. 1, 1917, no stallion shall stand for service in New York State which is not enrolled and certified by the department. The law prohibits the collection of fees for the service of unenrolled stallions.

An important article on the Municipal Abattoir by Dr. W. H. Dalrymple, Baton Rouge, La., appeared in the *Breeders' Gazette* for November 2.

The marriage of Miss Jennie Bertha Kelly of Lyons, Mich. to Dr. James F. Shigley occurred October 25. After December 1, they will be "At Home" at Kenmare, N. D.

The National Association of Bureau of Animal Industry Employees has again selected Secretary Walkley to act as legislative representative at Washington this winter. Other representatives will be sent if future developments show that they are needed.

The next meeting of the Iowa State Veterinary Association will be held at the Iowa State College at Ames, Iowa, Jan. 9, 10 and 11, 1917.

Dr. J. H. McNeil of the Brazil Land, Cattle and Packing Co., Sao Paulo, Brazil, will leave for the United States after January 1.

A NEW VETERINARY PUBLICATION. Arrangements are being made by Dr. O. Charnock Bradley, of Edinburgh, to publish a periodical review of Veterinary Literature, from which the practitioner and scientist will be able to obtain information of the appearance of important papers in the veterinary and allied press of the various countries.

Dr. L. McLean of Brooklyn, N. Y. has given to the Museum of the New York State Veterinary College at Cornell University, his interesting collection of pathological specimens of bone diseases, a number of instruments that were used in surgery more than fifty years ago in Scotland, and also the bones of the head and pelvis of a very distinguished elephant. This collection will be designated as "The McLean Collection".

The United States Meat Inspection Service certified to the wholesomeness of 11,220,958,000 pounds of meat from 61,826,304 animals during the last fiscal year. It condemned 348,945 animals and 738,361 parts of animals, equivalent to about 84,320,000 pounds of meat.

Of 16,700 cows tested through 47 Wisconsin cow-testing associations last year, 3,375 were disposed of as unprofitable.

Dr. I. D. Wilson of Blue Earth, Minn., has been appointed as an instructor in animal husbandry at the Pennsylvania State College, State College, Pa. He will have charge of the veterinary subjects required of the students. Dr. Wilson is a graduate of the Veterinary College at Ames, Ia. with the class of 1914.

Dr. S. B. Elliott of Bell Meade farm, in Fauquier County, Virginia has imported a herd of Welch ponies from the mountainous region of Wales.

The New York Convention of the National Association of Bureau of Animal Industry Employees authorized its executive committee to arrange for the publication of an official organ to be known as "The Inspector". It is to be published monthly.

The Report of the Chief Veterinary Surgeon for Southern Rhodesia, Africa, states that African Coast Fever occupies the largest place on the record. Trypanosomiasis is a constant men-

acc. The number of dipping tanks has increased 168 over the previous year.

Contagious abortion was first discovered in the territory in October 1914. Since then several additional centers of infection have been discovered in certain districts. The disease apparently exists in a less virulent form than in England.

Parasitic gastritis of cattle due to *Hemonchus contortus* is a greater cause of loss than is generally realized.

No cases of tuberculosis occurred during the year. The tuberculin test was applied to 78 imported bulls and heifers.

The territory continues free from glanders.

In the Eastern districts very heavy losses among sheep were sustained through an exceptionally severe visitation of blue-tongue.

UNSOUNDNESS IN STALLIONS. Reports received from 13 of the States having laws regulating the public service of stallions show the following percentages of unsoundness in stallions out of 2,640 reported cases:

	PER CENT
• Side bone	35
Laryngeal hemiplegia (roaring)	12
Bone spavin	11
Defective or curby hocks	7
Periodic ophthalmia	6
Cataract	4
Spavin (not classified)	3
Bog spavin	6
Ring bone	4
Stringhalt	3

The remaining 9 per cent consisted of such defects as chorea, general unsoundness, faulty conformation, and scattering imperfections.

These figures do not represent individual stallions, but indicate the number of cases of unsoundness. For instance, a single stallion may be affected with two or more physical defects and others with but one. A report from all the States having stallion license laws could not be secured, as in several no record is kept, but the figures given may be expected as reasonably offering an in-

dex to the most common physical defects among public-service stallions.

In some of these States certain diseases and unsoundness disqualify a stallion for service, while in others the stallion may stand, but the condition of soundness must be noted on the license certificate, a copy of which is required to be posted at the place where the stallion is being stood for service.—*The Rider and Driver*.

Dr. H. W. Graybill, who was recently appointed to a temporary position as research parasitologist in the Bureau of Animal Industry, has resigned to accept a position in the Rockefeller Institute for Medical Research, Department of Animal Pathology, at Princeton, N. J. He will work under the immediate supervision of Dr. Theobald Smith, who is Director of the Department of Animal Pathology.

Drs. W. R. Van Ness, L. B. Ernest and A. A. Crosland have been transferred to the Quarantine Division of the Bureau of Animal Industry with headquarters at Washington, D. C. They will be assigned to duty in connection with the tuberculin testing of dairy and breeding herds of cattle in the vicinity of Washington and in adjoining states.

A meat inspection station of the Bureau of Animal Industry has been established at Jacksonville, Florida, and Dr. Elmer F. Haven, from Nebraska City, Nebraska has been assigned as inspector in charge.

Dr. S. A. King has been designated as inspector in charge of B. A. I. meat inspection work at Waycross, Georgia.

FOOT-AND-MOUTH DISEASE. An Associated Press dispatch under date of November 27, states that the stock yards at Chicago and East St. Louis have been closed against the shipment of cattle, sheep and swine because of news of a suspected outbreak of foot-and-mouth disease in Nebraska, Kansas and Missouri.

A conference for Veterinarians will be held at the N. Y. State Veterinary College at Ithaca, N. Y., January 16 and 17.